VOL. XLVIII. No. 11 NOVEMBER 1963

MECCANO MAGAZINE

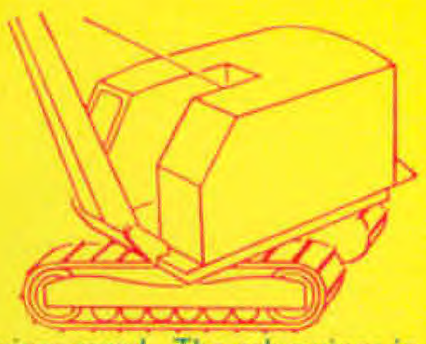
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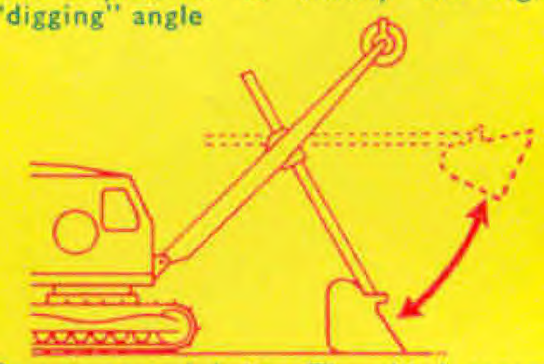
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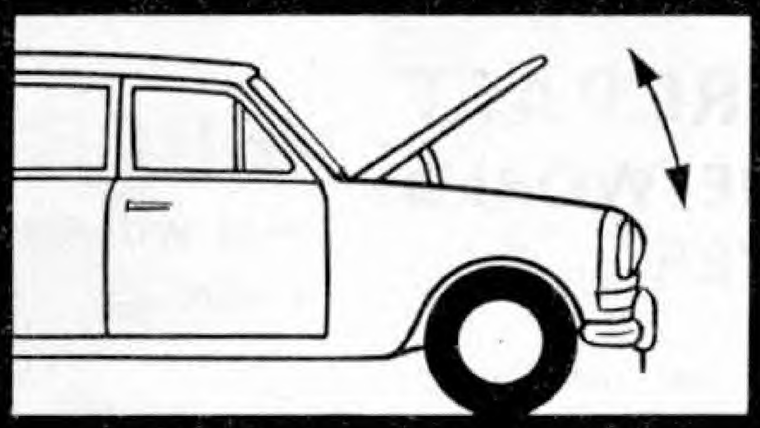
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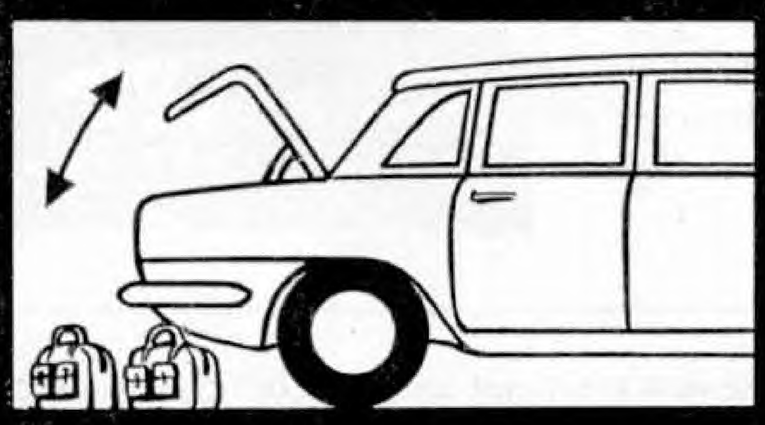
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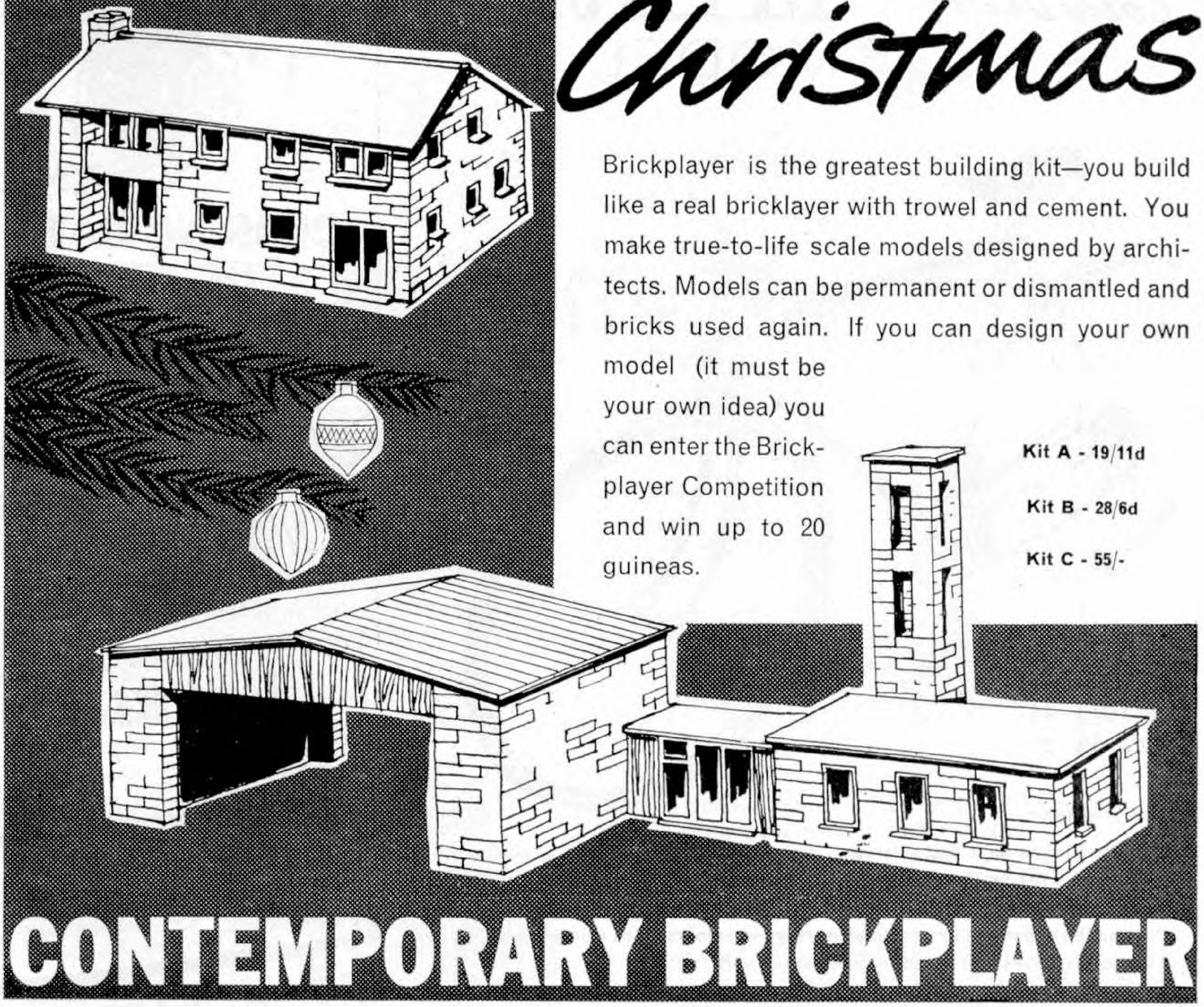
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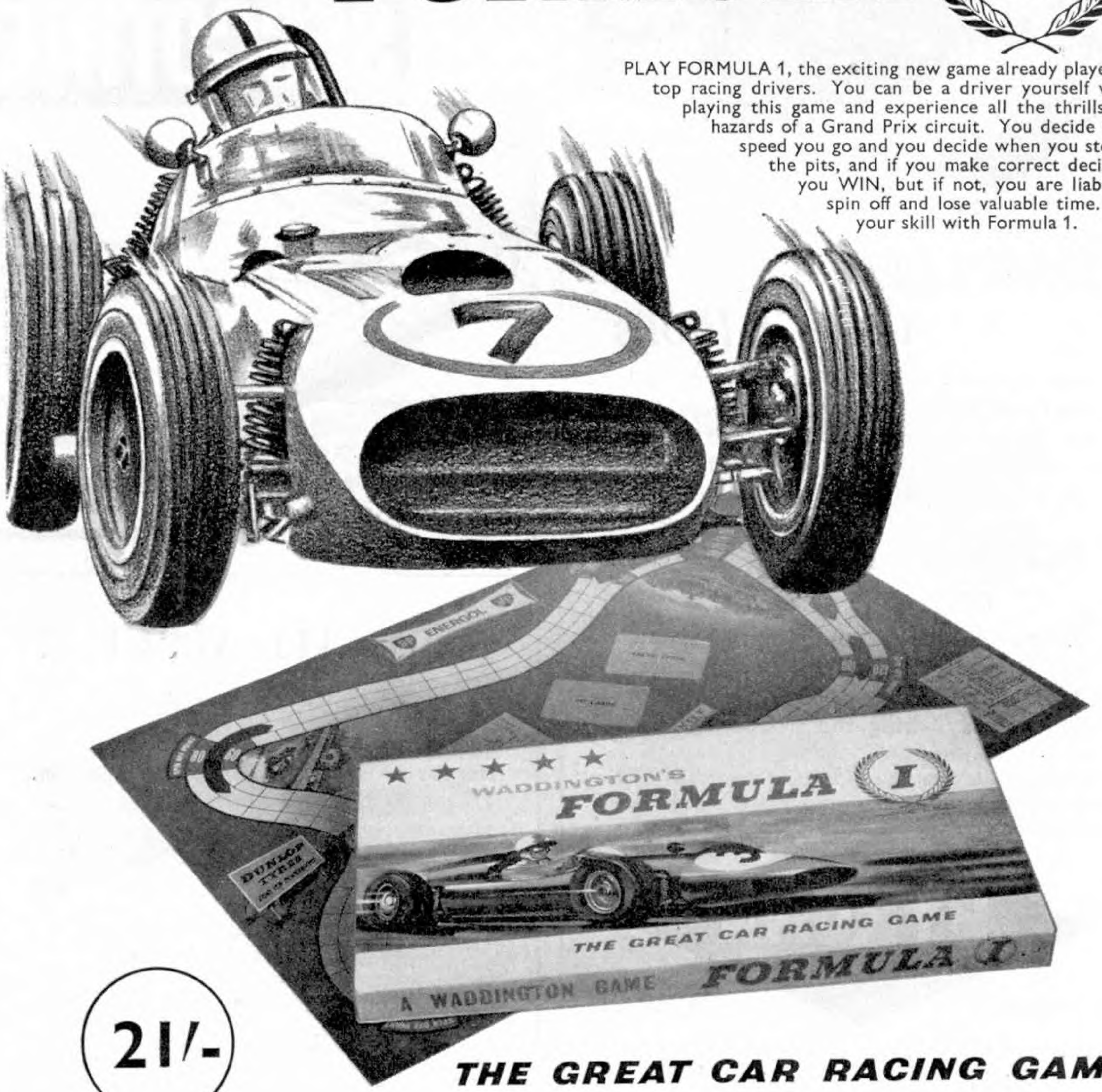
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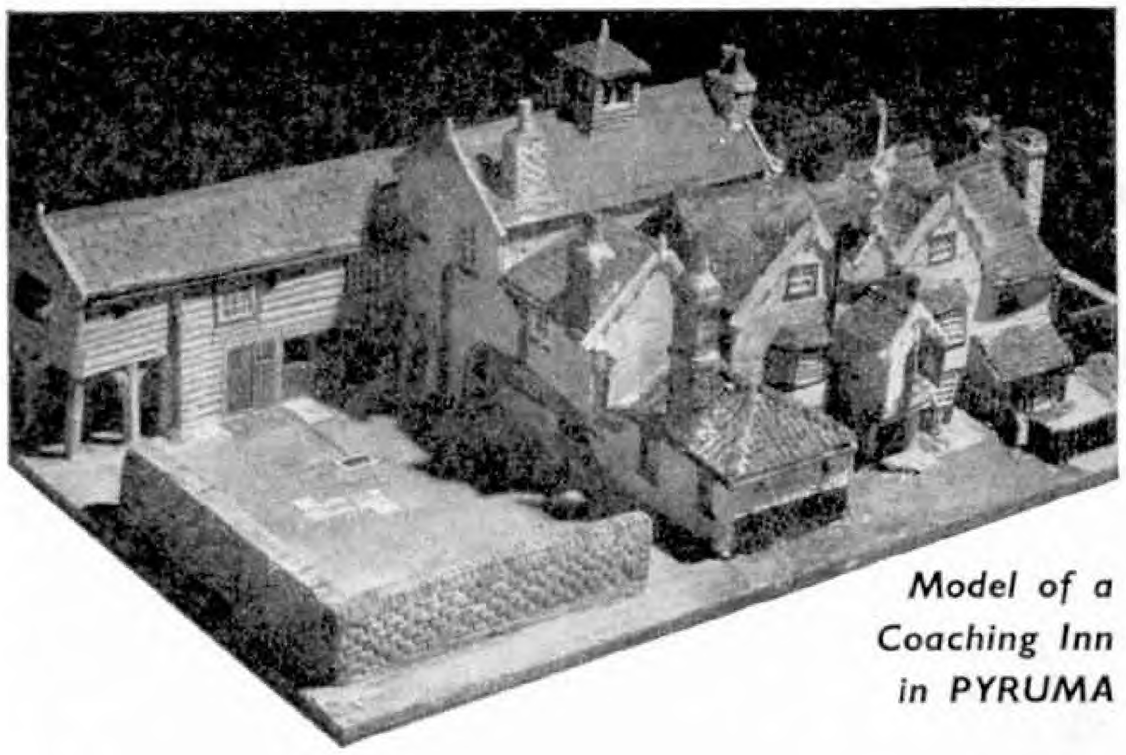


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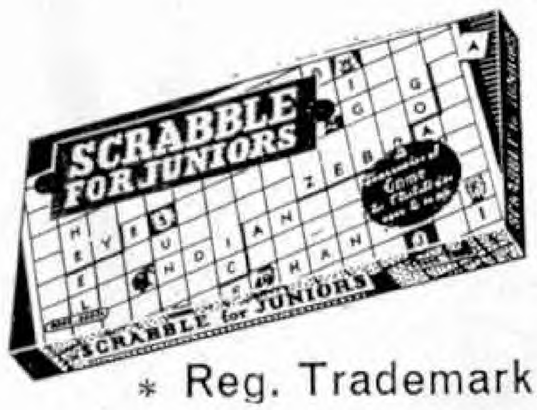
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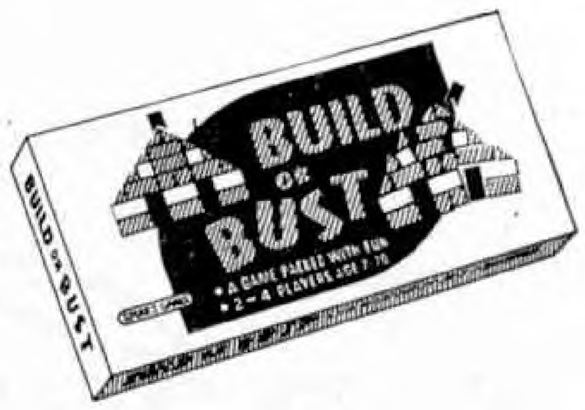
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MECCANO MAGAZINE

Volume XLVIII **No. 11** **November 1963**



Truck Power For Fishing Launch

IN the course of any month I receive material from all parts of the world bearing on all sorts of subjects, and quite often I am at a loss to know just which picture, out of dozens, to use as an Editorial topic. My choice fell on this month's illustration because of the unusual circumstances surrounding it. It shows a sea-going fishing launch in New Zealand—one of the type that takes fishing parties of about 50 people to the Hauraki Gulf, some twenty miles from Auckland, which abounds with schnapper and other species of fish. Morning and afternoon tea is provided for the trippers, together with two pounds of bait to lure the fish. During the summer season, several trips are also made at night-time. The unusual point about the picture is that the fishing launch—the m. v. *Florence Kennedy*—is operated by two of the highest powered diesel engines produced by Leyland Motors, Ltd. for their heavy-duty trucks. The engines, 200 h.p. Leyland Power-Plus 0.680 units, have been installed in the *Florence Kennedy* for her owners, Gulf Excursions, Ltd. of Auckland. The vessel is 59 feet long and has a beam of sixteen feet and a draught of four feet six inches. Two Leyland engines give her a speed of something in the region of twelve knots. Also installed in the vessel is an M.R.F. 10 3B oil-operated gear box, with a two to one ratio. This was made by Leyland's Coventry subsidiary, Self-Changing Gears, Ltd. I am indebted to the Publicity Department of the Leyland Motor Company for the illustration.

Well, here we are in November, and younger readers of the *M.M.* will be looking forward to Guy Fawkes' Night. I should be the last one to want to spoil their fun, but I would ask them to be very careful in the way in which they handle their fireworks, not to take part in silly pranks, and to remember that while youngsters love to listen to the bangs and see the glistening stars that fall from rockets and Roman Candles, domestic animals do not appreciate them at all. So please—remember your pets when you make plans for your Bonfire Night.

Finally, a few words about next month's Magazine which will be a bumper Christmas issue. One of the stories will be about Frontier Town, an authentic replica of a Wild West settlement built near a clearing at North Hudson, N.Y. I am sure all our younger readers will be thrilled by this fascinating article. In different vein, we shall be telling the story of that intriguing sport, Ten-Pin Bowling.

THE EDITOR

Next Month: SPECIAL CHRISTMAS NUMBER

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OUR FRONT COVER

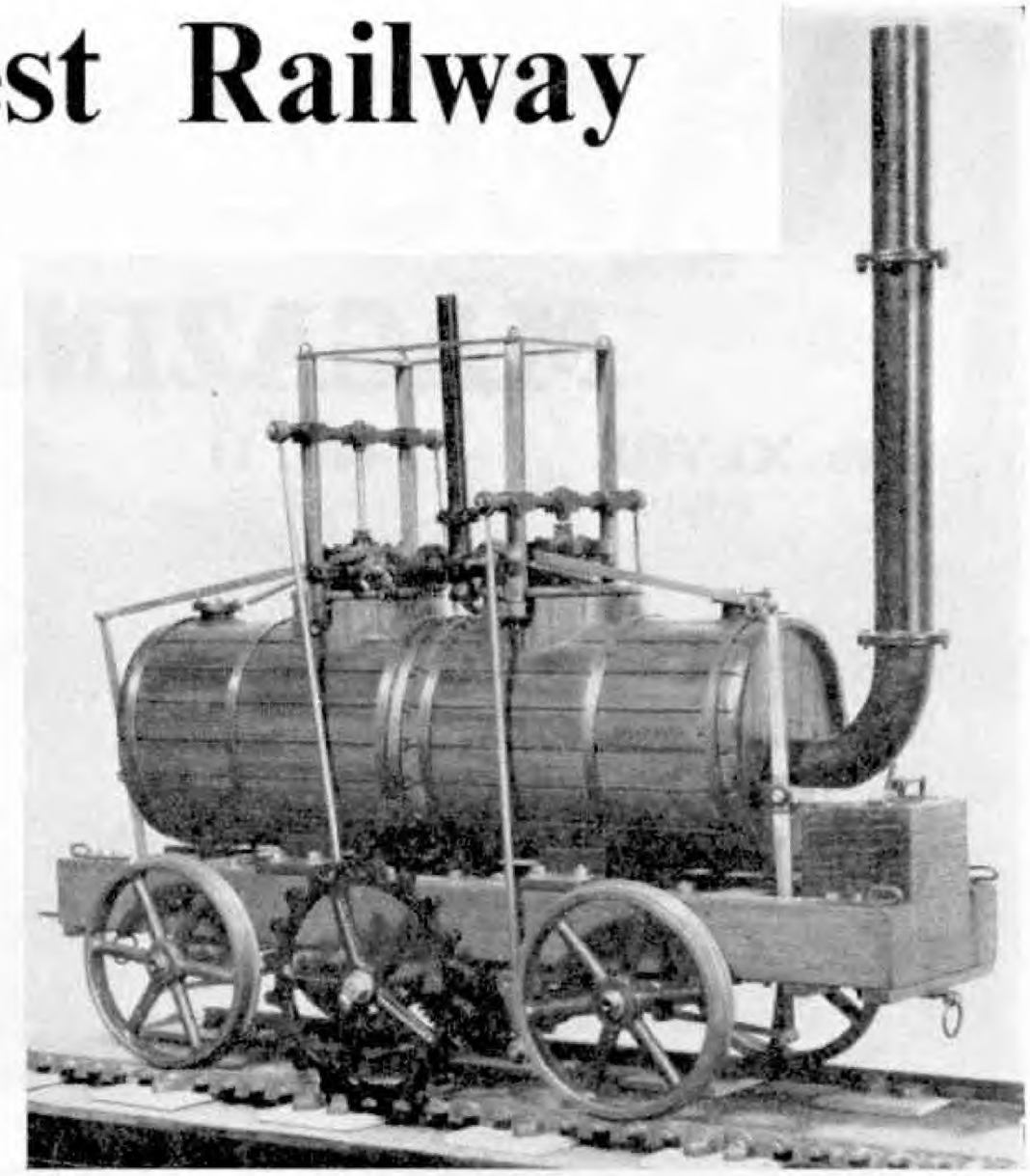
Even the camel shown on this month's cover turned its head to see what was happening when the crew of a Gnome Whirlwind helicopter decided to have an unusually close bird's-eye view of the famous Pyramids and Sphinx of Egypt.

This particular Whirlwind is one of the new Mark 10 models, powered by a 1,050-s.h.p. Bristol Siddeley Gnome shaft-turbine engine, and is finished in standard R.A.F. camouflage. It is far from small, with a rotor diameter of 53 feet, yet is dwarfed completely by these great monuments of the ancient world. At the time the photograph was taken the helicopter was on a sales tour of the Middle East.



The World's Oldest Railway

PIONEER LINE THAT IS STILL IN DAILY USE



EVEN among the keenest railway enthusiasts there is still a belief that Stephenson's railroad between Stockton and Darlington was the first to be operated by steam traction. Yet, a steam locomotive was hauling goods traffic on a railway near Leeds in 1812—thirteen years before Stephenson's line was opened. This pioneer steam-operated goods railway developed from one run with horsedrawn wagons on an edge-rail track laid down as long ago as 1758, and the Act of Parliament sanctioning this was the very first Railway Act.

The Act permitted the laying down of a "waggon way" (as the railroad was termed in the Bill) for carrying coal in the Leeds neighbourhood. The line extended from Middleton Colliery to a point on the River Aire near Leeds Bridge, a distance of about three miles.

In return, the owners of the colliery and railway had to under-

By Arthur Gaunt

take to supply at least 24,000 tons of coal annually at just over 4s. 2½d. per ton, although the quantity and price were subject to revision by later Acts.

But the most remarkable thing about the Middleton Railway is that part of it is still maintained and is in daily use as a goods line. It survives despite the fact that, when its bicentenary was celebrated in 1958, the occasion seemed likely to be a requiem as well. The passing of this historic line appeared to be unavoidable.

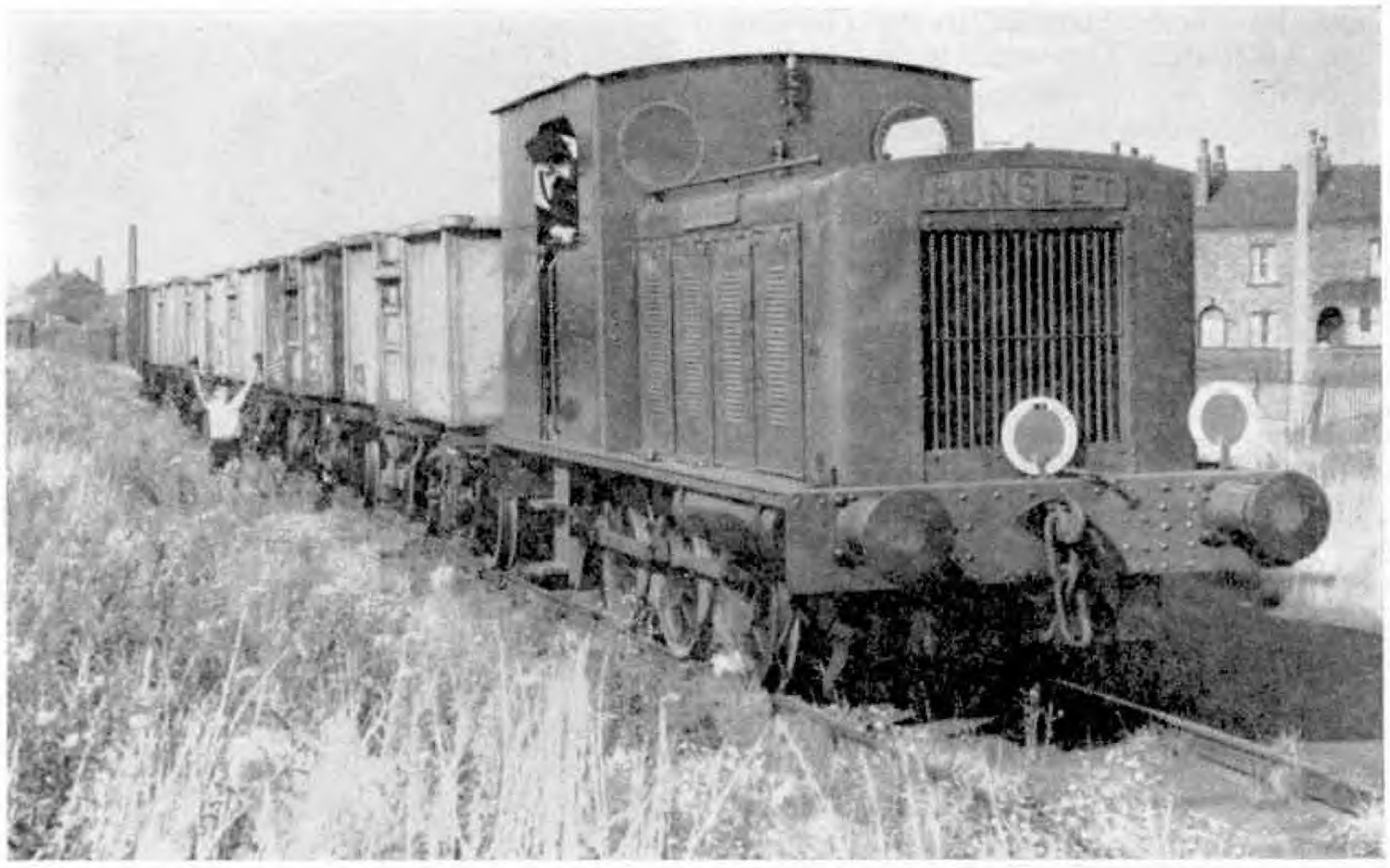
The line at that time presented a depressing picture. In many places the permanent way was completely worn out and the gauge could not be relied on. The lineside fences were dilapidated, and the system in general looked to be in the last stages of decay.

The National Coal Board had taken over Middleton Colliery in 1948, and from that date the line was operated by the Middleton Fireclay Company, successors of the colliery's private owners. After operating the line, together with a number of sidings and extensions added during its 200 years' history, the Fireclay Company closed down in 1958 as a result of operating difficulties, and the complete disintegration of the railway seemed imminent and inevitable.

Shortly after the bicentenary, indeed, the Middleton Railway was abandoned by its owners, and the first road ever built into the colliery started to carry the coal. Only a short section of line from the colliery to Parkside Junction, on the former Great Northern Railway, was relaid and worked by British Railways, and the land on which the line ran was sold—a step which seemed to make even more certain that the world's oldest commercially-used steam railway would soon be only a memory.

Yet, only two years later, during the 1960 Leeds University Rag Week, more than 7,700 people had free trips along a section of the line, and today a considerable proportion of the coal mined at Middleton goes along this noteworthy railway.

Credit for the amazing transformation goes mainly to a Yorkshire group of



Top: An artist's reconstruction of the "Salamanca", built in 1812, which ran regularly at Middleton, Leeds, several years before George Stephenson opened the Darlington to Stockton line. Left: This diesel locomotive seen in use on the Middleton Railway was built at Hunslet in 1932. It is backing up in the course of its shunting duties.

railway enthusiasts, members of the Leeds University Railway Society. In January, 1960, they founded the Middleton Railway Preservation Society for the express purpose of preventing the line from going into oblivion. The venture has also been supported by British Railways and private firms with premises near the railway.

Two local firms were generous enough to buy the line and give the Preservation Society an almost free hand in getting the main section working again, while British Railways have given invaluable help in the form of advice and co-operation.

Restoring and maintaining the permanent way, and thus enabling it to be used regularly again, has been hard but rewarding work. Members of the M.R.P.S. have spent many hours repairing broken rails, replacing rotted sleepers, and strengthening and painting fences and gates. Attention to the permanent way has included relaying the sleepers closer together and replacing the dirt and coal ballast with stone ballast.

To obtain material for track improvements some double-track sections have been converted to single-track, the spare rails, chairs and bolts then being used on the section retained.

So far, permanent way improvements have enabled about two-thirds of the original main line to be used again, and about 16,000 tons of coal, pit props and other freight are now carried by the Middleton Railway each year.



"Restoring and maintaining the permanent way . . . has been hard but rewarding work", says the author of this article. Our picture shows enthusiasts busily employed on the arduous task of platelaying.

A rota for drivers, shunters and guards is operated each day by the M.R.P.S., and this line was the first Stephenson-gauge (4 ft. 8½ in.) railway to be run regularly by amateurs.

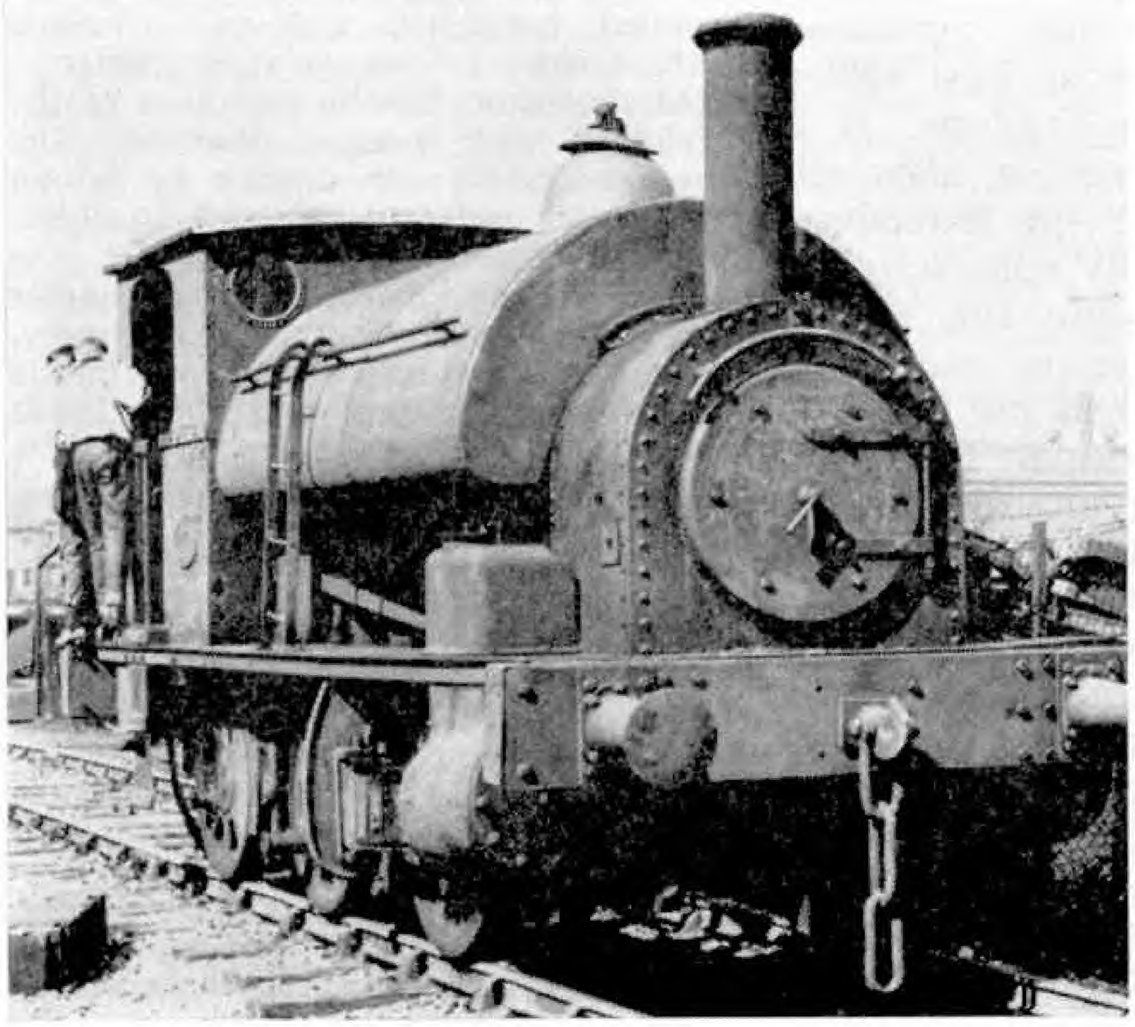
It is unique in other ways, too. The rolling stock includes the oldest diesel locomotive still working in Britain, after giving yeoman service on British Railways main-line routes. This engine was built in 1932 and was one of the first batch delivered to the L.M.S. Railway. The society acquired it from the Hunslet Engine Company, near the Middleton line, who built it, and into whose possession it had returned. It is a 132 h.p. locomotive and has a maximum speed of 30 m.p.h.

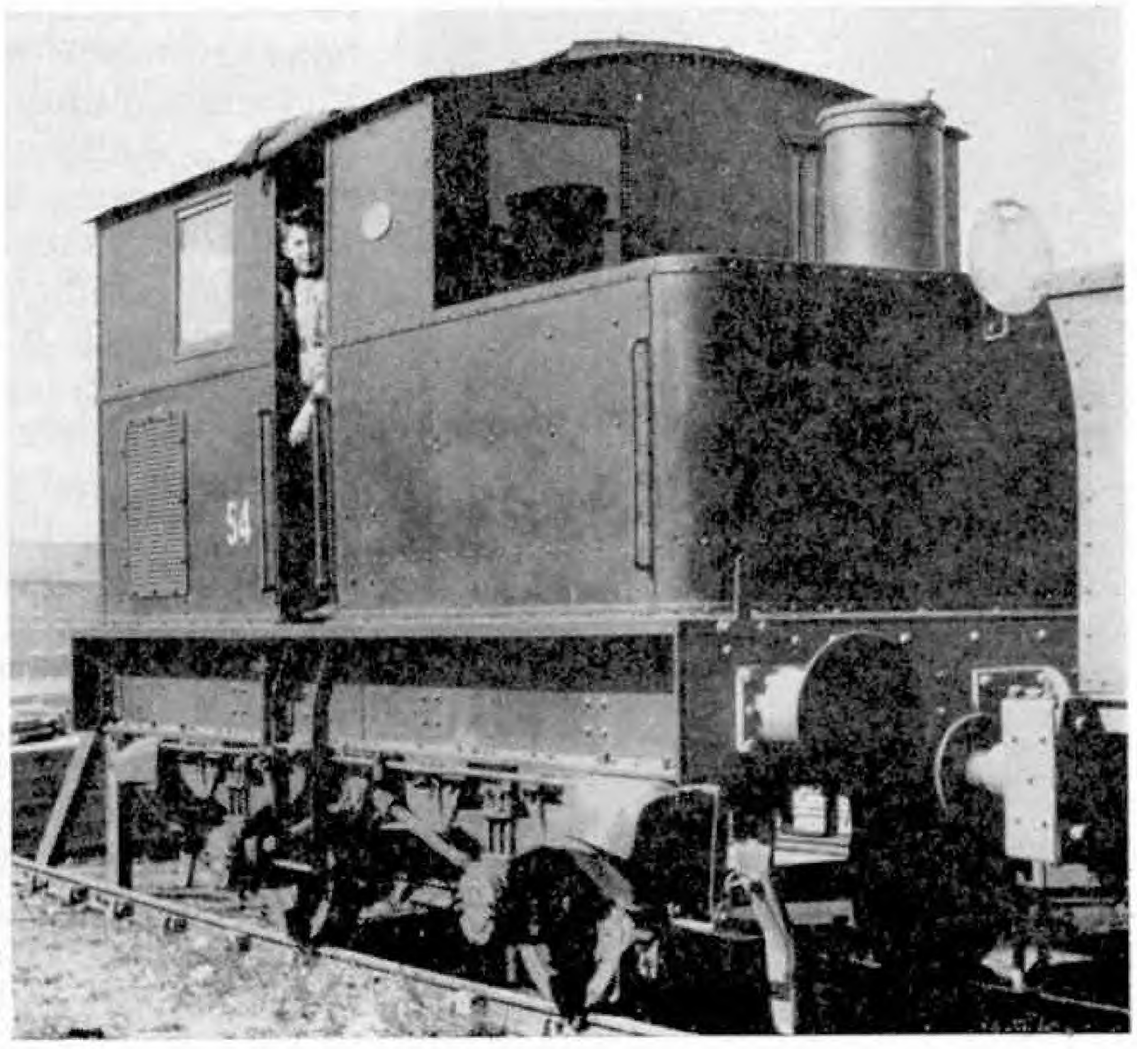
Other vintage rolling stock has been added, one of the aims of the society being the formation of a museum for Stephenson-gauge souvenirs. Incidentally, the original gauge of the Middleton Railway was 4 ft. 1 in. and it was not altered to 4 ft. 8½ in. until 1881.

When the Swansea and Mumbles Railway was closed, in 1960, and its dismantling was begun by a Sheffield firm, the M.R.P.S. negotiated for one of the coaches, and this was brought to Leeds. It was used again for passengers at the

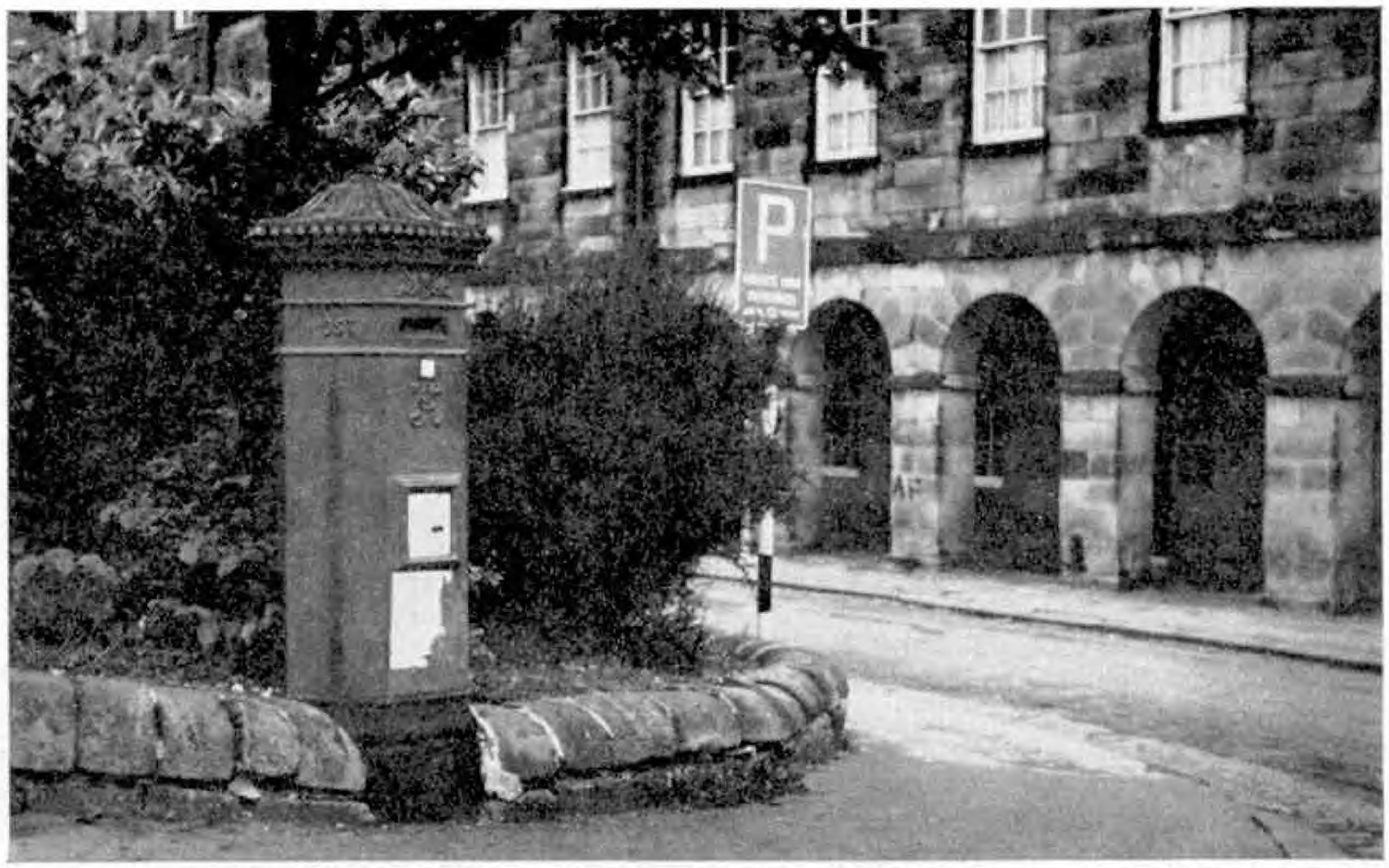
(*Continued on page 488*)

Below (left): 0–6–0 Saddle tank locomotive "Swansea", formerly employed on the Swansea and Mumbles Railway and at Bynea Steelworks, arrived on the Middleton Railway in April 1962, having been presented to the Middleton Railway Preservation Society. It is seen here before restoration. (Right) Sentinel locomotive, ex-Darlington Works No. 54, and formerly B.R. No. 68153, now restored, is kept busy on the Middleton Railway.





CONTAINERS CRAMMED WITH CHRISTMAS CHEER



The elegant, six-sided Victorian mail-box, with a handsomely embellished sloping roof, located opposite the Pavilion Gardens, and near to the eighteenth-century Crescent, at Buxton.

IN a short time now our well-known and affectionately regarded crimson mail-boxes will once more be crammed to overflowing with Christmas cheer in the form of gay, festive cards, colourful calendars, friendly letters and exciting packages. Yet, a mere 111 years back, no one in the British Isles had ever used such a thing as a pillar-box.

Nevertheless, posting-boxes had appeared on the Continent some years before this date, and even as far back as 1655 Louis XIV of France ordered a number of exceptionally weighty and very elaborately embellished specimens for the Paris boulevards. His brave enterprise, however, was completely ruined by legions of mice which were popped inside the container in derision!

This graceful letter-box is more than 100 years of age. It stands in the main street at Eton, is of a fluted design, and has a vertical slot.



A century later, street letter-containers were established on the Continent, although pillar-boxes, as we know them, did not originate until 1844, when they were first seen

By

Geraldine Mellor

in the streets of Belgian towns. Ten years afterwards this particular type of box was adopted in Paris.

So, you see, the generally favoured belief which attributes the mail-box invention to that renowned Victorian author and Post Office servant, Anthony Trollope, is a fallacious one. Even so, although he did not create the letter-box, Trollope is officially considered to have brought it into the British Postal Service.

Several people had put forward such a proposal prior to Trollope's stepping into the picture, among them Sir Rowland Hill, inventor of the Penny Post in 1840, who, while on a visit to France, was so struck by the usefulness of the boulevard posting-boxes there that he enthusiastically recommended similar containers all over London and other important cities and towns in Great Britain. Always conservative in their outlook, the British Postal Authorities ignored their employee's practical suggestion. But in the winter of 1851 Trollope, at that time an Assistant Postal Surveyor, visited the Channel Islands and saw the frequently long distance of the post office from various parts of St. Helier, capital of Jersey. He offered such a strong and forceful case for the establishment of pillar-boxes there and in other parts of the Channel Islands, that they were eventually introduced, becoming the first in the British Isles.

* * * *

It was thus an historic occasion when, in November 1852, four pioneer green-painted, hexagonal, cast iron roadside letter-boxes were set up at St. Helier in plenty of time for the reception of the Yuletide mail, because that was the premier opportunity anyone in Britain had been granted to use such an object for this purpose.

Three months later, a trio of similar receptacles were introduced at Guernsey. Printed information was displayed on the thoroughfares stating that these boxes were legally free for the deposit of letters at four focal points, and collections would take place twice daily, at 6 a.m. and 12 noon.

Britain's initial letter-boxes were received with fervent acclamation by the Channel Islanders and then, two years later, came the occasion when it was possible to drop festive mail into letter-boxes in England for the first time. These original English post-boxes were erected at Cheltenham, and shortly afterwards—in December 1854—at Ludgate Circus, London. Although this last-named box was used by some enthusiasts, especially







Left: An ancient "Victoria Regina" flat wall letter-box which may be seen on the wall of St. Peter's Vicarage at Fairfield, Buxton. There are several old-type mail boxes still in use in this moorland spa. Centre: This round pillar-box, depicting the rare royal monogram and cipher of King Edward VIII, is located in Mauldeth Road, Heaton Mersey, near Stockport. Right: A George V letter-box on a post, seen decorating the countryside at Chelmorten Ditch, Derbyshire.

just before the Christmas season, most City men looked upon the new-fangled contraption with jaundiced eyes. They looked on it with suspicion, and continued to use the old and trusted General Post Office in St. Martin-le-Grand.

During the following fifteen months seven further London pillar-boxes were instituted. Set up at Cheapside, on the north and south sides of Piccadilly, at Rutland Gate, in the Strand and along Pall Mall, they drew forth the uncomplimentary description of displaying "a stove-like design, reminding one of the latest of the London conduits" from that long-established magazine, *The Illustrated London News* in its issue for March 24, 1855. It showed a picture of one of them and, to be truthful, the periodical certainly had hit the nail on the head, for these cast iron containers did look like stoves. They were short in height, square in shape, and with a curving domed roof exhibiting a radiating design of palm foliage, and supporting a big iron globe on top.

* * * *

Next time you are at Waterloo Station, London, take note of a letter-box looking like an ancient stove, only taller. This is the nearest model I know to the original London street mail receptacles, all of which have long since gone. Waterloo's sample dates only from the early years of the present century.

Now began the Great Letter Box Age, and by 1860 nearly 2,000 mail-containers were established throughout Britain. Such an uninspired notion as building them to one similar ornamental pattern simply never crossed anyone's mind. In fact, such diversity in design was undertaken during this period that innumerable shapes and sizes resulted. Some of the boxes were made taller and many of them were extremely graceful, as, for instance, the long elegant fluted box located to this day near the public school at Eton. This box, which has a vertical slot, must be over a century old.

Nineteenth century pillar-boxes were not merely rich in themselves, they were, in addition, commendably adjusted to be in concord with Georgian, Regency and neo-Classic terraces and villas. For example, the thousands who have gone to Derbyshire's holiday town and watering resort of Buxton over the years have never failed to be enchanted with the artistic hexagonal early pillar-box sited in a position of great charm at the foot of Water Lane, adjacent to The Crescent (eighteenth century), and opposite the Pavilion Gardens.

Likewise, Wellington Place, St. John's Wood, London has kept its refined Victorian letter-box when so much other cast iron work that was old and valuable has been allowed to disappear from the Metropolis.

Lavish encrustations in metal were the vogue as regards many letter-boxes, and these included heraldic flowers and leaves, wreaths, rose garlands, floating ribbons, lions' faces, crowns and Maltese crosses. Certain boxes had a Dutch tile in the slot.

Flat wall boxes were introduced, in addition to containers fixed to lamp-posts and pillars, and large double boxes appeared in big cities. All receptacles were painted green, brown, bronze, yellow or blue until 1874, when "pillar-box red" was selected as the standard hue. It is the royal colour and can be easily distinguished. The weather-resisting paint utilised is prepared from a particular formula.

* * * *

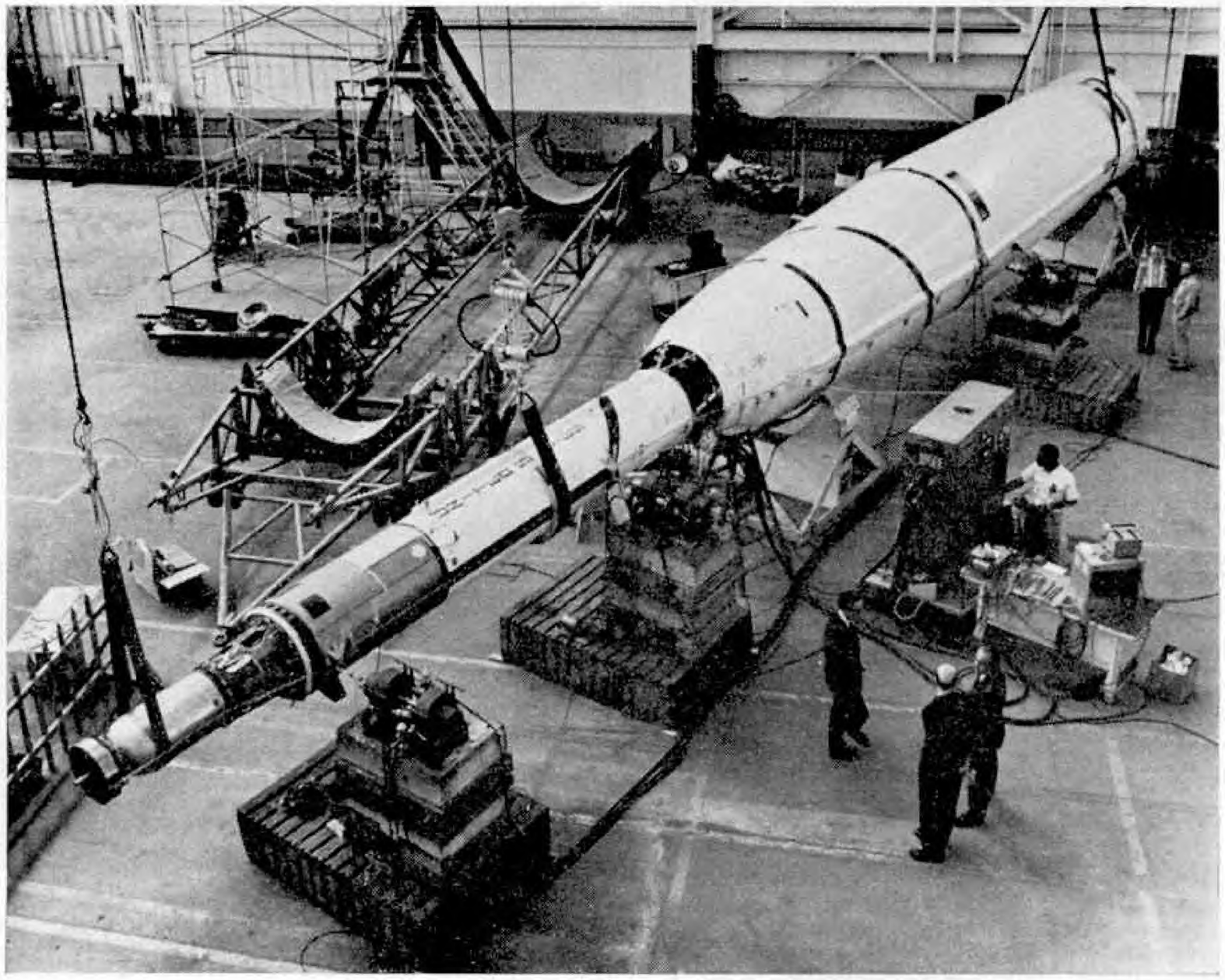
In addition to the few really antiquated samples still doing faithful service, scores of street letter-boxes are between 70 and 80 years old. They are so well made that an average of only six replacements are needed yearly. Britain possesses around 90,000 of these containers, and daily approximately 80,000 postmen clear them of somewhere in the region of 19,000,000 letters, cards and packets, this total rising steeply at Christmas time, of course.

Every street pillar-box displays the royal monogram and cipher of the reign in which it was built, the rarest being "E VIII R", referring to King Edward VIII, whose short reign lasted only from January to December 1936. An Edward VIII posting-container, much patronised by amateur photographers, can be seen in Mauldeth Road, Heaton Mersey, near Stockport.

Conversely—and intriguing to young and old alike—are a letter-box situated in Exeter, which is bereft of both monogram and cipher but boasts a novel triangular cover in the form of a cowl over its aperture, and an eight-angled box in New Ross, Co. Wexford, Ireland. Dating from 1860, this has been painted green, given the "P.T." device of Irish Posts and Telegraphs, and yet keeps its regal "V.R." cipher.

SPACE NOTES

The Problem Of Vibration



AS equipment becomes more complex, so there is a greater tendency for it to break down. With a simple piece of equipment, say a spade, there is so much user experience that it is possible to make an efficient one that can be almost guaranteed not to fail during its owner's lifetime. With more complex items for use on the ground a large safety factor in the design can ensure continuous working for many years. But when we come to vehicles, where weight must be limited, special problems arise. No longer can a "little bit extra" be used to ensure safe operation, neither is there, at least for the more modern forms of transport, such a backlog of experience.

By
J. HUMPHRIES,
B.Sc.(Eng.), A.M.I.Mech.E.,
A.F.R.Ae.S.

Thus an efficient and safe design, let us say of an aircraft, depends to a very great extent on long and arduous testing of not only the complete aircraft but also its individual components — fuselage, engines, controls, structural members—and even the paint, for faulty paint can allow corrosion to occur which, in turn, could bring about a structural failure.

When the individual components have been thoroughly proved they are put together and, quite often, faults due to their interactions arise. One of the most common causes of failure due to such interactions is vibration. All structures have a "natural frequency" and, if quite a small force is applied at the natural frequency, a vibration can be built up which is sufficient to cause a failure, sometimes in minutes.

Where large power-plants are used, as on rocket boosters, there is a great deal of waste energy available which can cause mischief. Thus all important rocket items must be vibration-tested on special shaking machines and finally the whole vehicle must be tested. This latter is not an easy matter since the vehicle must be supported in a suitable manner, and, if possible, the air forces that it will be subjected to must also be simulated. When this is done, exciting forces are applied to the vehicle by means of very large loudspeaker-like devices which are connected directly and are driven by means of large electronic amplifiers. Our first picture

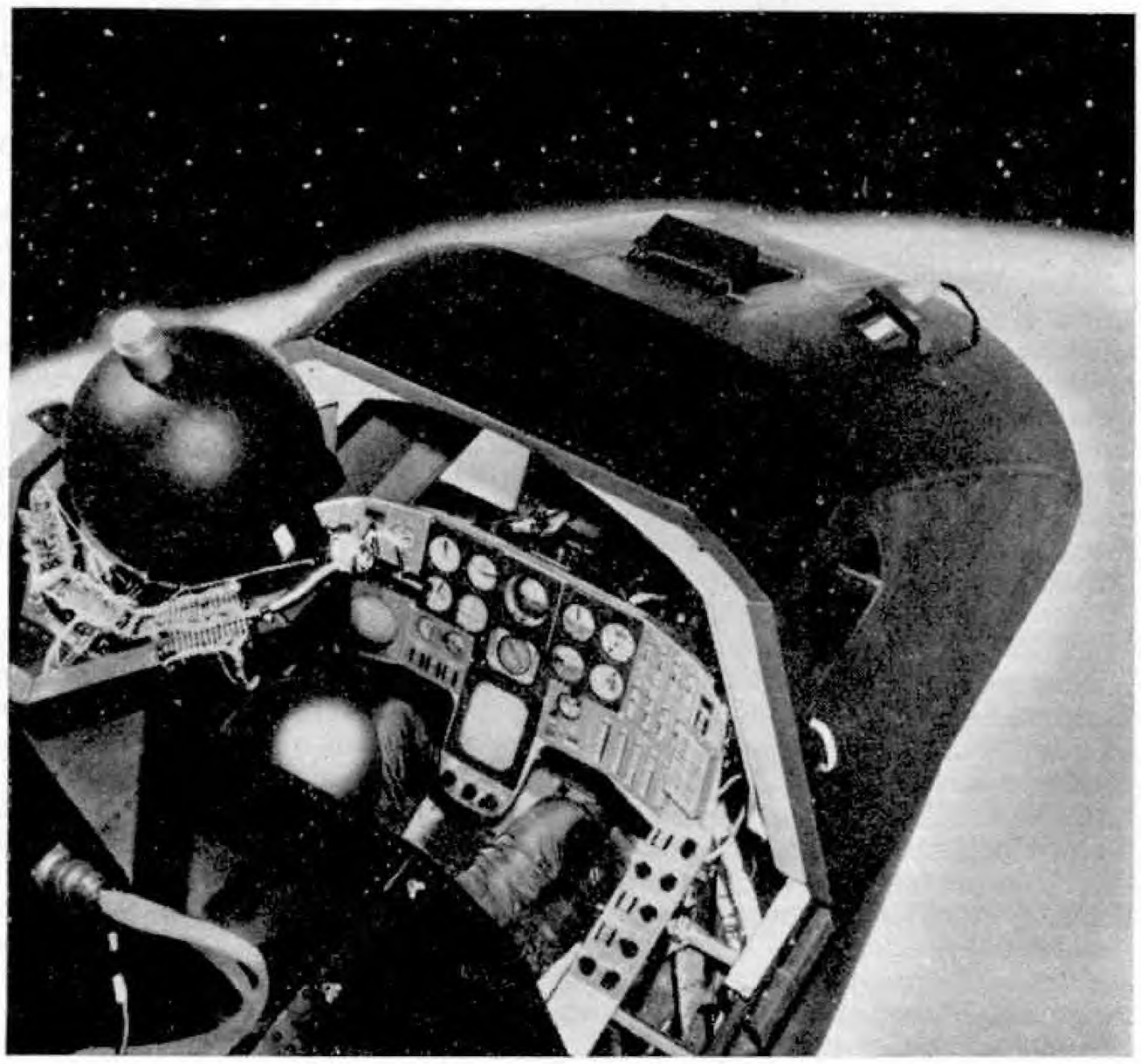


Fig. 1. A Delta space vehicle, similar to the one that will launch the next British satellite, undergoing vibration tests. Photograph by courtesy of Douglas.

Fig. 2. Pilot in full pressure suit in simulator. The stars on the 20 ft. sphere are projected from the small spherical planetarium above the pilot's head. Photograph by Ling-Temco-Vought.

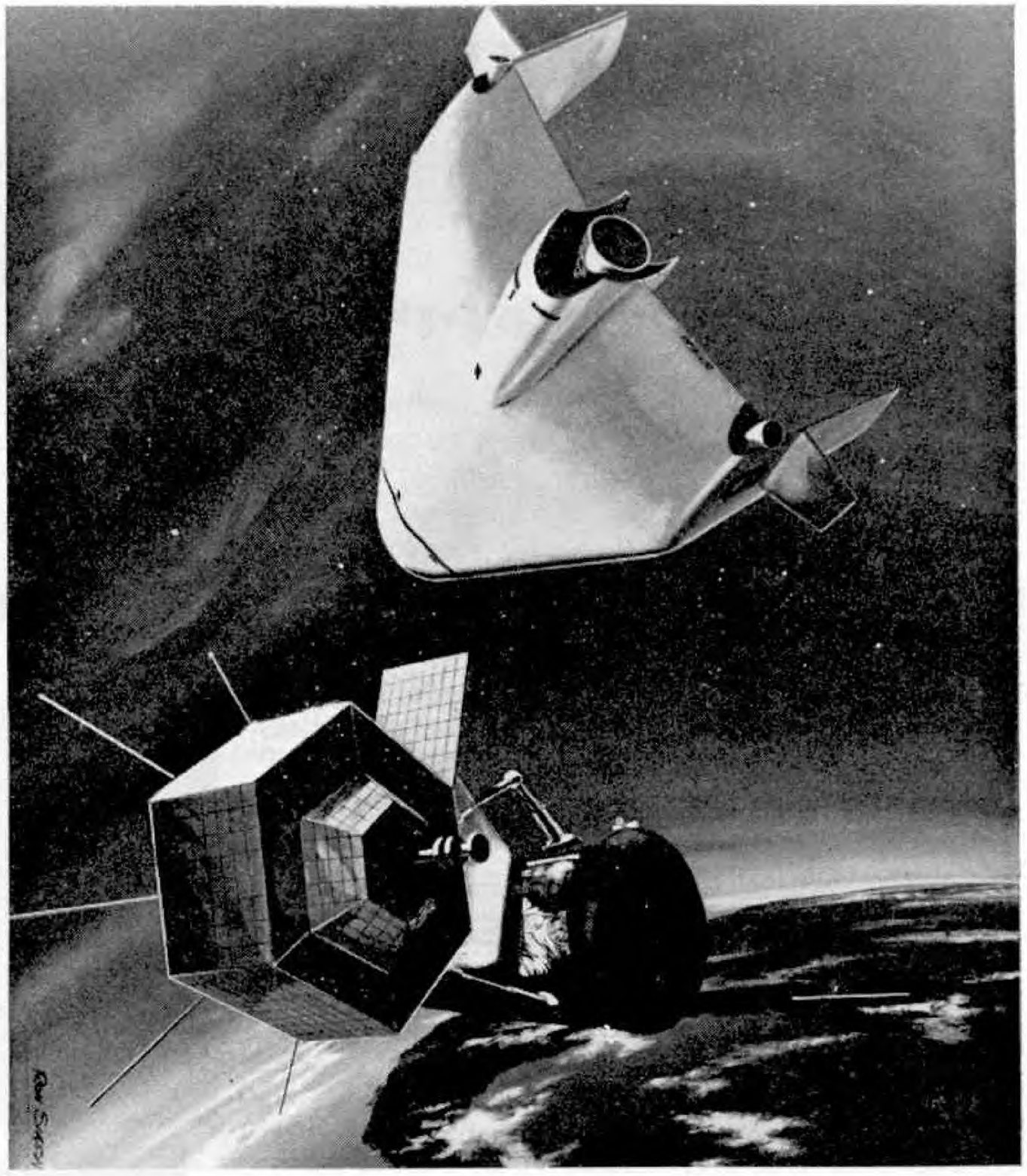


Fig. 3. ASTRO being used to service a small scientific satellite. Photograph by Douglas.

shows a Douglas Delta booster under vibration test. It is supported by three cradles which are placed at the "nodes", this being the technical name for those points which remain still during vibration—the points part-way between the nodes which have the greatest movement being called the anti-nodes. The three "exciters", as the loud-speaker like devices are called, can be seen on the near side of the rocket connected to the anti-node positions. The amplifier to drive them is standing on the floor half-way along the rocket.

SPACE SIMULATORS

When all the testing is completed the vehicle, if it is a manned one, must have an efficient man to operate it, if it is to work effectively. As it is not possible to design the man along with the vehicle the next best thing is done—the most suitable man must be chosen. For a simple vehicle such as a car, the man must be able physically to operate the controls, be able to react correctly in an emergency and know a few simple rules of the road. To pilot an aircraft a considerable period of training is required and the method of flying each new aircraft must be learned. To learn to fly modern air-liners would be an expensive business if each pilot had to fly one around for several hundred hours without passengers, and to reduce training costs, devices known as flight simulators are used. These consist of a cabin mock-up complete with all controls and instruments but with the windows replaced by a screen on to which various views of runways can be projected. The pilot can "fly" the simulator, the view on the screen changing according to the manner in which he operates the controls. Thus pilots can be familiarised with new aircraft types without even leaving the ground.

The potential astronaut is at a considerable disadvantage when it comes to training. It is quite impossible to get a "joy-ride"—apart from the fact that all space vehicles so flown have been single-seaters, the present cost, at several million pounds per flight, would be quite prohibitive.

Thus flight simulators play a very great part in training and one of the most complex so far made is that installed by Ling-Temco-Vought in their plant at Dallas, Texas. It consists of a gondola mounted on the end of a steel arm which can move it in all directions. Inside the gondola is a single-place cabin surrounded by the instruments that would be found in a space vehicle. Windows look out at the inside of a 20-foot diameter fibre-glass sphere on to which can be projected earth, lunar or planetary horizons plus a simple star-field. A variety of flight schedules including satellite, lunar and inter-planetary can be simulated and accelerations similar to those during take-off and manœuvres can be applied—although only for short periods. Weightlessness cannot, of course, be simulated, but there are facilities to vibrate the pilot at amplitudes up to $\frac{1}{2}$ inch, a Hi-Fi system to reproduce take-off conditions at full noise level, and heating elements to raise the internal wall temperature to 240 degrees F. to simulate re-entry heating. Thus all the discomforts of space-flight can be sampled without moving more than 20 feet!

ASTRO SPACE TRAINER

As space-flight becomes more common, it will become necessary to give real flight as well as simulator training and Douglas have proposed a vehicle configuration that can be used for training purposes. This is ASTRO (Advanced Spacecraft Truck/Trainer/Transport Re-Usable Orbiter). It consists of two components, a spacecraft and a booster. The spacecraft is 65 feet long with a 44 ft. wing span, and in its training version would be piloted by a crew of two. The booster is a scaled-up version of the spacecraft, 95 feet long and is designed to take a pilot so that it can be landed and re-used.

As its name suggests, the vehicle has three uses, as a "truck" for servicing manned space stations, for training pilots, or for carrying passengers—ultimately a total of ten. In its earlier versions ASTRO would take off either horizontally from a powered sled or vertically, using an additional six Zeus sustainer rockets. This first phase vehicle would be designed specifically for non-orbital training flights to enable re-entry experience to be obtained and gradually development would lead to the more ambitious transport versions by about 1970.

RAILWAY HISTORY

The Severn and Wye Railway by H. W. Paar (David & Charles, Dawlish, 30/–).

The sub-title *A History of the Railways of the Forest of Dean, Part I* describes the subject matter of this book. The intricate railway history of the Forest of Dean covers the period from 1800 to the present time, against a background of the laws and traditions of this Royal Forest and of the collieries and industries of the district. Horse haulage, steam tramway locomotives, the broad gauge of Brunel and diesel traction all find a place in the story. In the present volume the Severn and Wye, and the Severn Bridge Railways are dealt with; a later volume will cover the other railways of the Forest of Dean area.

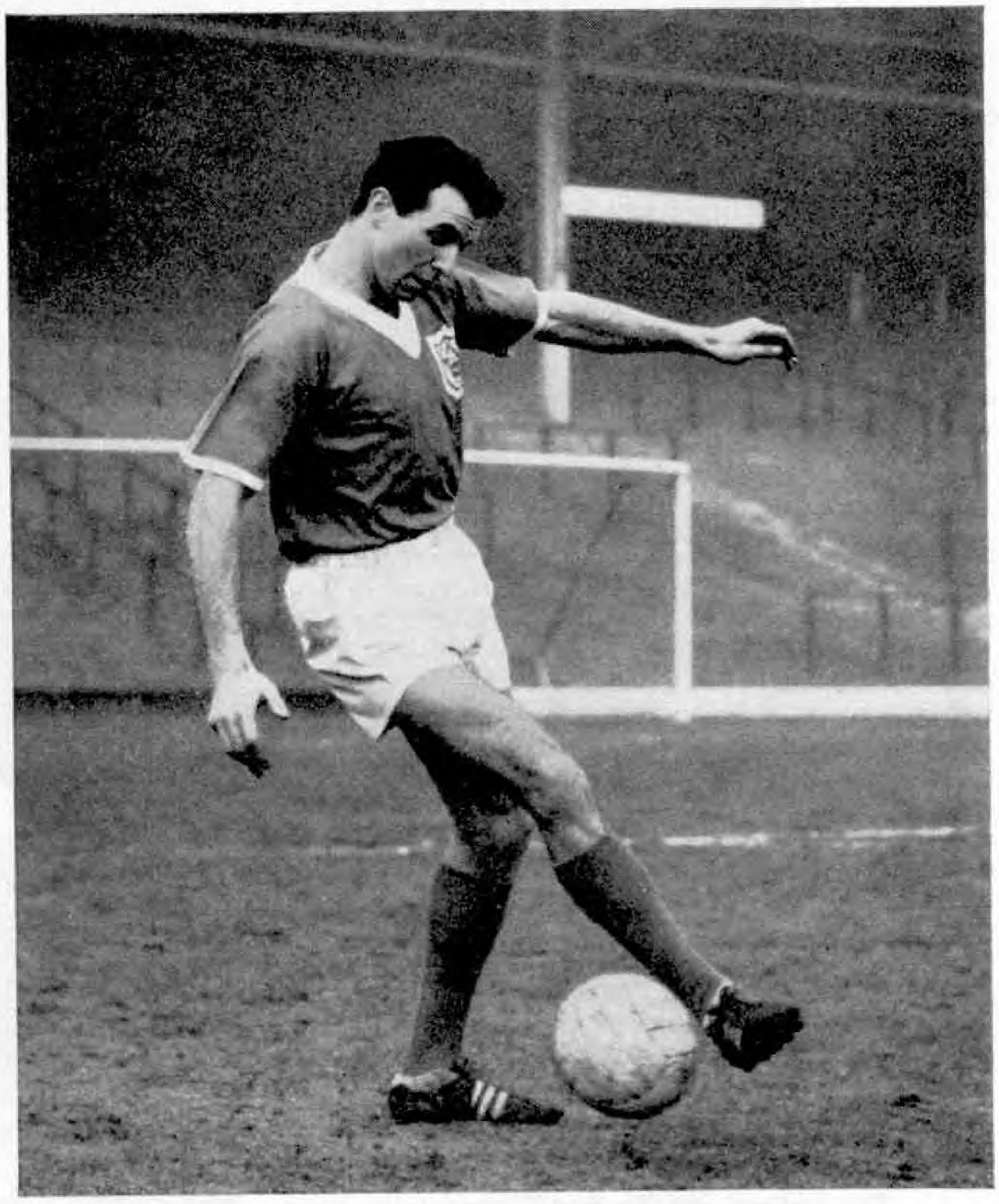
Much research has gone into the preparation of the book, which is a treasure house of quaint names of stations, collieries and other places, while apart from the historical aspect it recalls some of the sayings and the doings of the often highly individual characters concerned. Locomotives, rolling stock, engineering works and installations are all dealt with, and there are maps, diagrams and half-tone illustrations. This is a book for those who take their railway history seriously. They will undoubtedly find much that appeals in its pages.

SOCCER SKILLS

LESSON No. 1 — TRAPPING

OUR first lesson concerns the controlling of the ball with the foot—or as many people prefer to call it, trapping. Of course, many of you will have been coached on this before, in your school or youth club, but in spite of this I have decided to begin our actual Soccer lessons with this subject simply because it is very important for you to learn how to perform the skill correctly. It takes a lot of time and patience to get anywhere near perfection, and many professional footballers have failed at a vital time in a match simply because they have misjudged a pass or a long ball when near to goal.

By JIMMY ARMFIELD,
England International Full-Back



The easiest manner of foot control is with the use of the inside of the foot. This is simple because it means that you only have to more or less lean on the ball to get it under control. With your eyes fixed firmly on the ball all the time, let it come towards the inside of the foot and, as the two are about to come into contact, let your foot go back slightly so as to cushion the speed of the ball. This is quite essential, because if you simply let the ball hit your foot then it will bounce off it as if it had hit a brick wall. You have to use your arms, too, for they help you keep your balance.

Balance, is, in fact, very important; without it you will never be able to play this game of football, for it has to be remembered that most of your game is performed with one foot off the floor. To put it bluntly, you are standing on one leg when you are actually in contact with the ball.

Another way of trapping is with the outside of the foot (see first picture). This is far more difficult to perfect than the method we have already discussed, and it entails a great deal of practice. The idea of controlling a ball in this way is so that you can take the ball away from an opponent, and still control it, all in the same movement. If you look at the picture you will see that when it was taken I was actually at the point of the trap. I have moved my right leg across in front of the left leg, which, you will further note, is fixed firmly on the ground for perfect balance. I have let the ball almost touch the toe of my left foot and then dragged it around the right-hand side of the body with the outside of the right foot. This enables me to turn to my right and yet still have the ball under control. Note how the whole body leans in a line from right toe to right shoulder and yet, by holding out the arms, perfect balance is retained.

The third way to trap is to use the underside of the foot (see lower picture). Here, I have had to reach forward to control a ball which has actually fallen short of me, and because of this I have no alternative but to use the sole of my boot to trap it. Note that the trapping is done with the underside of the toes (because this (*Cont on page 489*)



NEW FERRIES HAVE LIGHT ALLOY DECK HOUSINGS

TWO 50-ton passenger ferries constructed at an Essex shipyard have been fitted with aluminium alloy superstructures for service in the West Indies. The material was specified to maintain a low centre of gravity and a higher degree of stability than would be obtained with heavy steel deck housings. In addition, as aluminium has a high degree of resistance to corrosion, its use will minimise maintenance costs.

The two vessels, of identical construction, have been ordered by the Bermuda Board of Trade and will be operated by the Bermuda Public Transportation Board, Hamilton. They have been built by The Rowhedge Ironworks Co. Ltd. of Rowhedge, near Colchester, Essex to the design of Alan H. Buchanan Ltd. of Burnham-on-Crouch, Essex. They are constructed according to the rules of Lloyd's Register of Shipping for classification 100 A.1 and to Ministry of Transport Regulations for ships of Class VI.

Each boat, measuring 54 feet overall with a beam of 15 feet and a maximum draft of 4 feet 10 inches, is designed to carry 77 passengers. A welded steel hull fabricated from $\frac{1}{4}$ inch plate is specified.



One of two passenger ferries for service in Bermuda, seen here on the River Colne, near Colchester, Essex, prior to delivery to the Bermuda Public Transportation Board.

The aluminium superstructure consists of a wheelhouse forward, a main saloon, an aft deckhouse and a funnel located at the forward end of the saloon. The saloon and deckhouse are covered with a plywood–fibreglass roof which is extended fore and aft on the saloon to form a sun shelter, the stern end extension being supported by aluminium alloy tubular pillars. All the deck housings are of pre-fabricated construction from $\frac{1}{4}$ inch MG5 plate supplied by James Booth Aluminium of Kitts Green, Birmingham. The aluminium sections were joined by a combination of riveting, bolting and welding using the argon arc process, the complete units being attached to the steel hull by bolting on to steel coaming plates welded to steel stringers on the main deck. All joints were sealed with Densochrome tape, which consists of a cotton tape impregnated with metallic chromates and petroleum jelly to form a waterproof and permanently flexible seal.

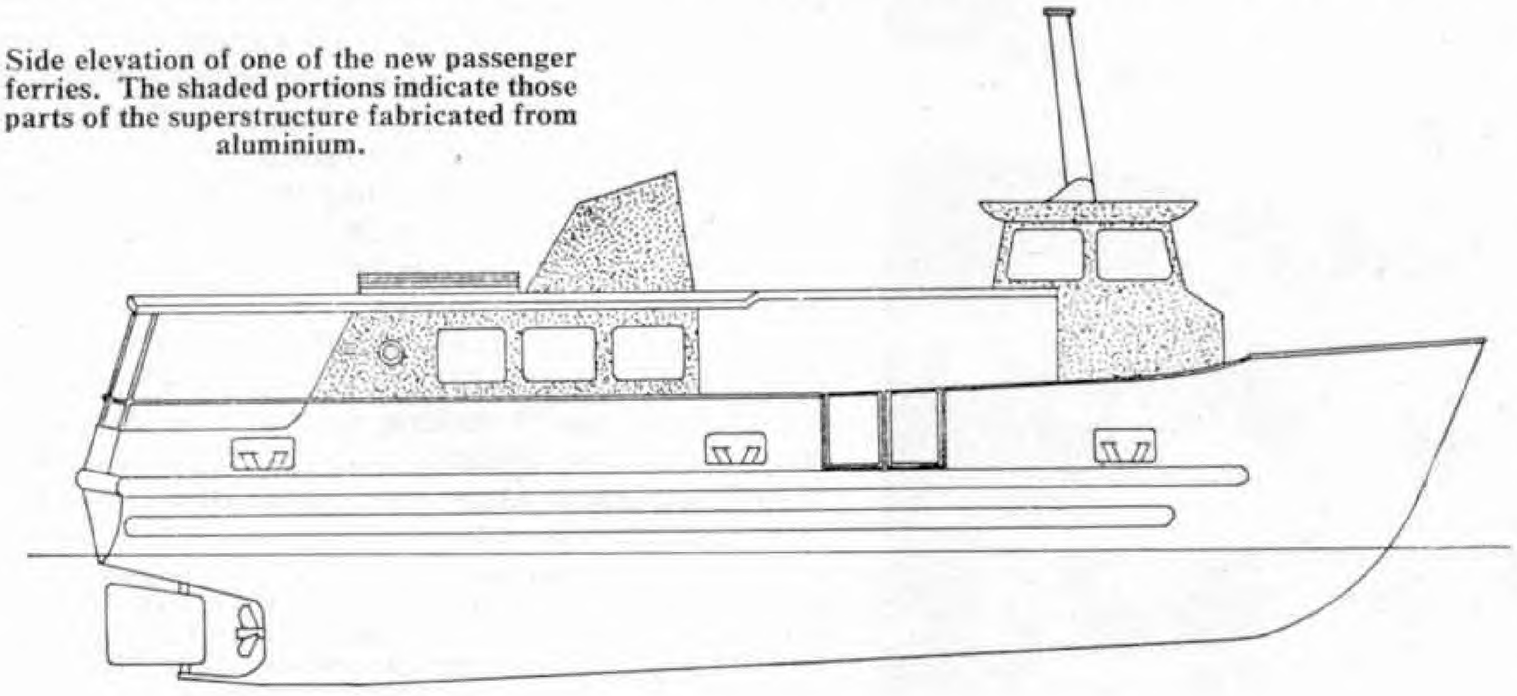
The saloon has seating accommodation for 35 passengers, and a further twelve seats are fitted in the aft deckhouse.

Each vessel is equipped with a steel plate foredeck, the remainder of the decking being of $1\frac{5}{8}$ inches thick Afromosia African hardwood, the seams being caulked with cotton and rubber compound. Forward of the wheelhouse is a hatch giving access to a small store for the carriage of parcels and mail.

Each vessel is powered by a Gleniffer-type DH8 diesel engine developing 160 b.h.p. at 900 r.p.m. and which is fitted with an integral reverse gear, driving the manganese bronze single screw propeller through a mild steel intermediate shaft and a Monel metal tail shaft. The engine is supplied with fuel from two 500-gallon tanks located aft. As the vessels will be required to manœuvre in restricted spaces, Goodyear heavy duty rubber fenders are fitted at the main deck level and around the transom. A bow fender of coir matting is also specified.

Rowhedge Ironworks Co. Ltd. was founded in 1904 and since that date has built more than 900 vessels of up to 800 tons dead weight.

Side elevation of one of the new passenger ferries. The shaded portions indicate those parts of the superstructure fabricated from aluminium.

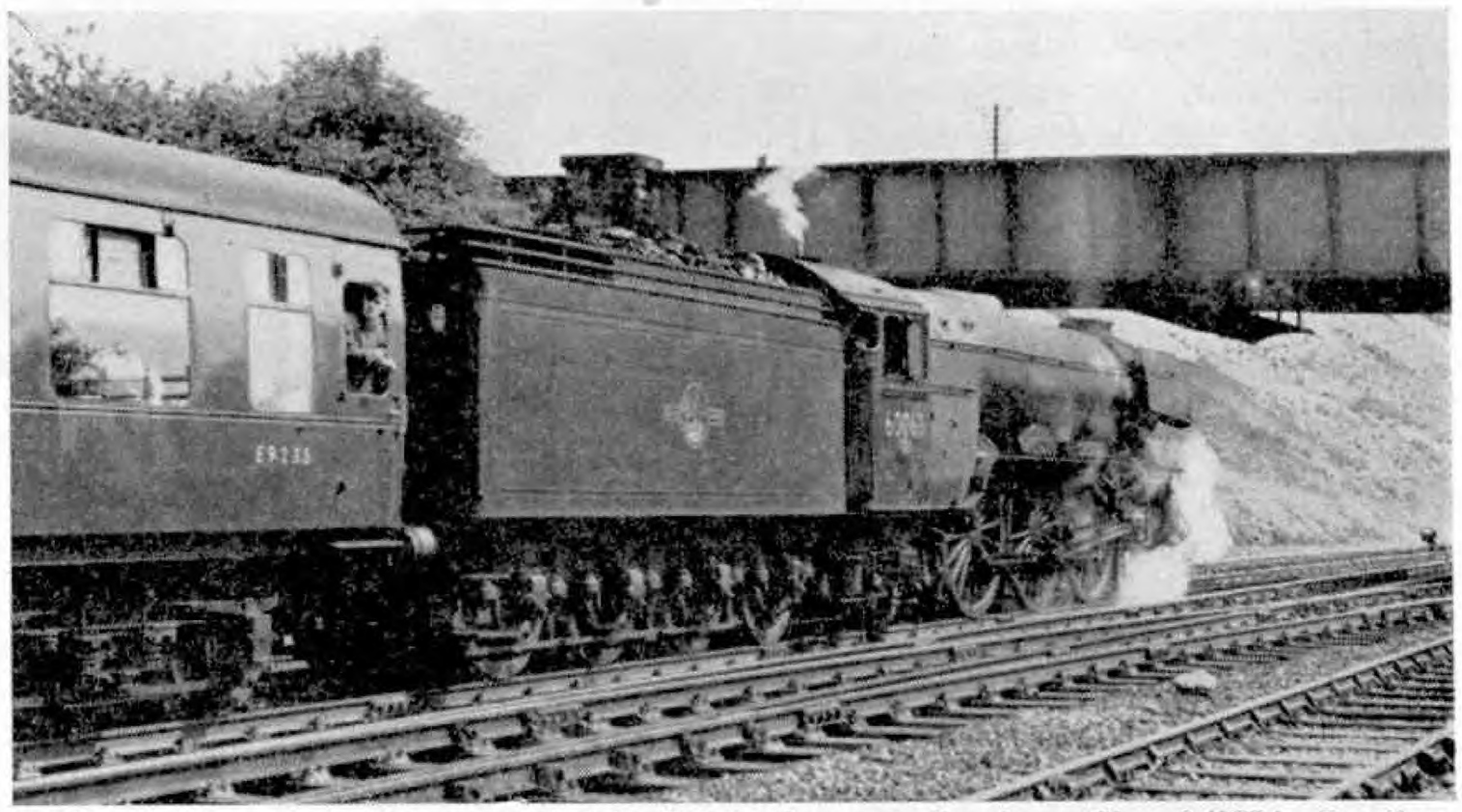




RAILWAY NOTES

Contributed by R. A. H. Weight

ANOTHER SIX MARSHALLING YARDS



A3 "Isinglass" caught by the camera of J. D. Elliott, when re-starting the southbound "White Rose" up Beeston Bank, near Leeds. Pictured in the panel at the top of the page is V2 No. 60955 on an up fish train from Aberdeen. Photograph by R. Russell.

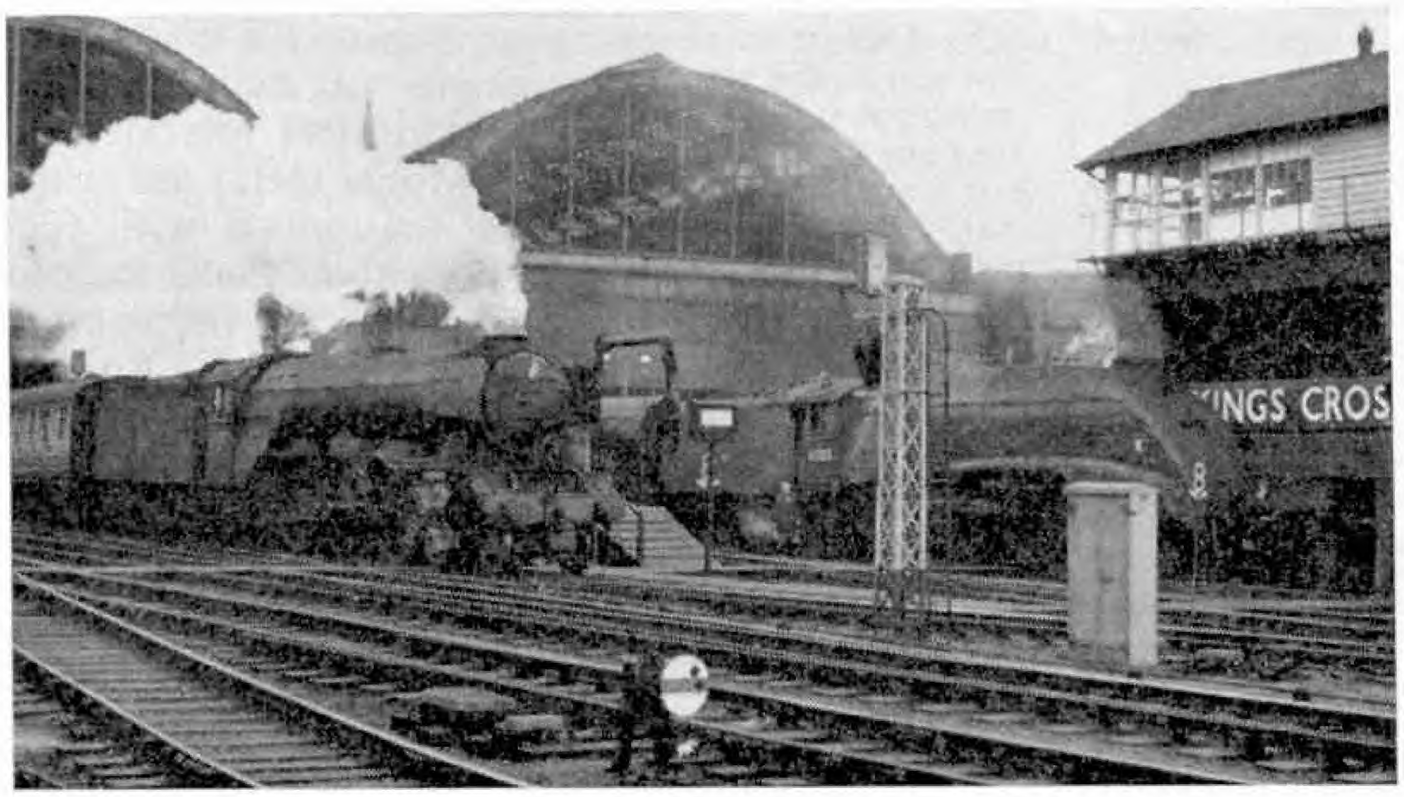
THE construction of more fully-mechanised marshalling yards has been a notable feature of recent large-scale B.R. modernisation schemes to simplify and accelerate the transit of freight and mineral traffic. Actual tonnage in 1962 totalled 228 million and efforts are being made to increase that figure considerably.

The pioneer mechanised yard in England, at Whitemoor, close to March, in Cambridgeshire, was completed more than 30 years ago by the then L.N.E.R. It was there that I first saw wagons, descending gently from a shunting "hump", being directed by press buttons in a control tower to their correct tracks in a wide, fan-shaped group of sidings. In later installations electrical and other scientific or mechanical aids have further facilitated rapid sorting, control and re-despatch of wagons—and with less hard or dangerous work by the staff.

During 1962–3, big yards were brought into commission north of Perth Station and at Kingmoor, north of Carlisle on the Glasgow trunk routes, while *Millerhill*, about six miles south of Edinburgh, astride the Waverley main line to Galashiels and Carlisle, *Tees*, between Thornaby and Middlesbrough, *Tyne*, at Lamesley, four miles south of Newcastle on the west side of the main East Coast tracks, and *Healey Mills* west of Wakefield, Yorks., by the Calder Valley main lines towards Manchester and Lancashire generally, are the names of others. The three last-named are N.E.R. undertakings, close to coalfields and other large industrial sources of traffic.

All these yards, adjacent to various junctions and diverging routes, have superseded a number of old and smaller places less economical to operate, and are worth watching for by readers who happen to be travelling through the areas concerned. Such yards with a handling capacity of 3,000–4,000 or more wagons a day can extend over several miles.

The following brief description is typical: Tyne Yard covers 135 acres, with 54 miles of track including 69 sorting sidings and an extensive group of tracks used by through, and stopping, trains and for departures in each



Pacific No. 60063 "Isinglass" leaving King's Cross just before the last regular steam workings ceased south of Peterborough. Seen by the signal box is No. 60008 "Dwight D. Eisenhower" awaiting departure time with an evening train to Edinburgh. Photograph by B. C. Bending.

direction. There are also new inlet or outlet lines, engine lines and so on. Trains to be "broken up" arrive on a reception line. From the wagon labels checkers take particulars of destinations and notify them to the Chart Room in the Control Tower. They then uncouple wagons singly, or in groups, to be shunted.

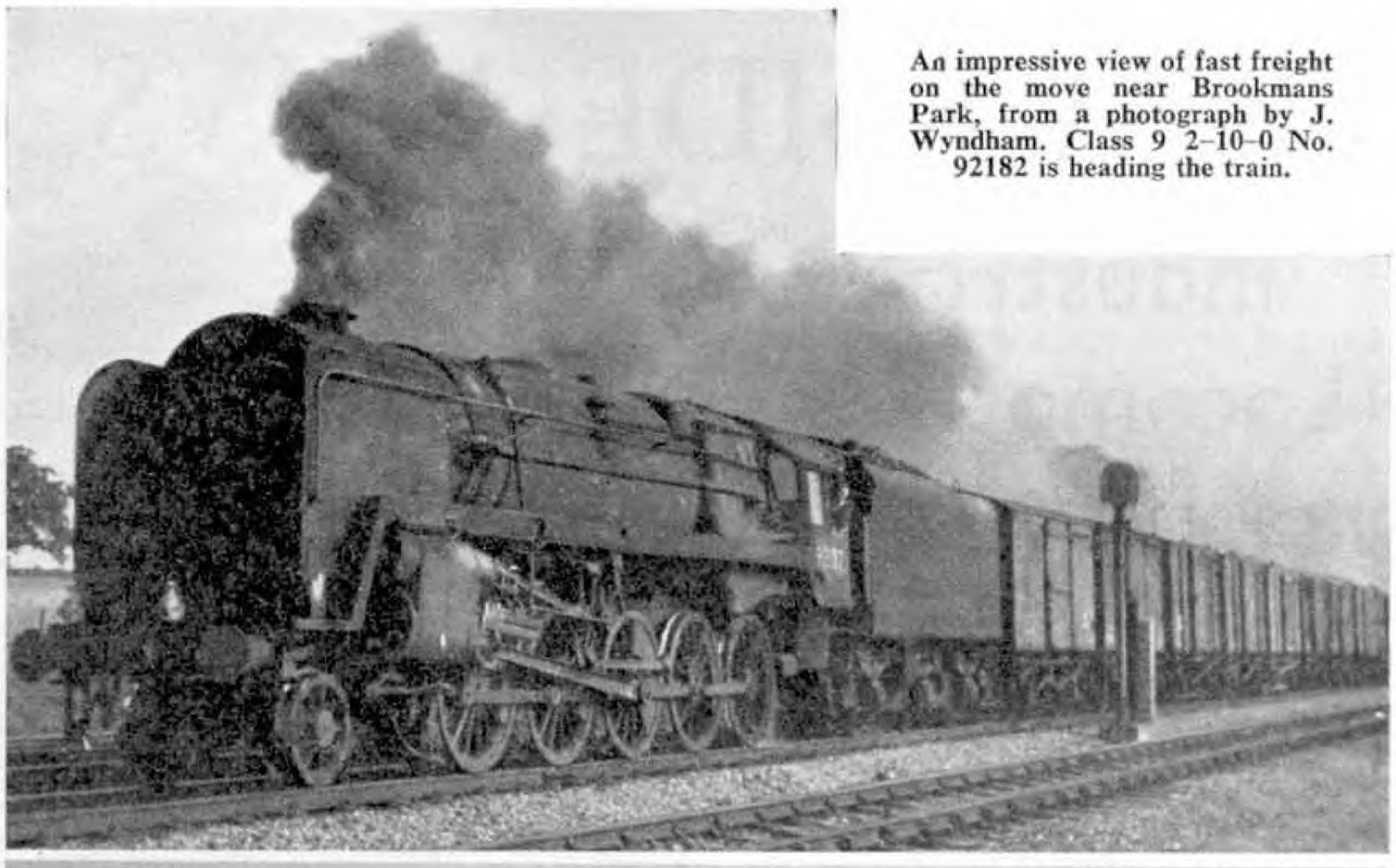
When the appropriate signals have been cleared these wagons are pushed over the "hump" by a diesel locomotive. As they run down on a maximum gradient of 1 in 16, they are automatically braked—according to speed and weight electronically detected—by means of retarders gripping the wheels as they pass. The control tower operators can pre-set routes for as many as 50 separate "cuts" of wagons, which are diverted automatically, so it seems, in rather fascinating fashion to their correct siding for re-forwarding. Secondary retarders further down can be controlled individually by hand switches on the control console. Compressed air actuates the power-operated, quick-acting points.

In some yards, highly-developed communication equipment includes radio telephones linking control room and the hump-engine drivers, colour light signalling and repeaters in locomotive cabs, and closed-circuit television.

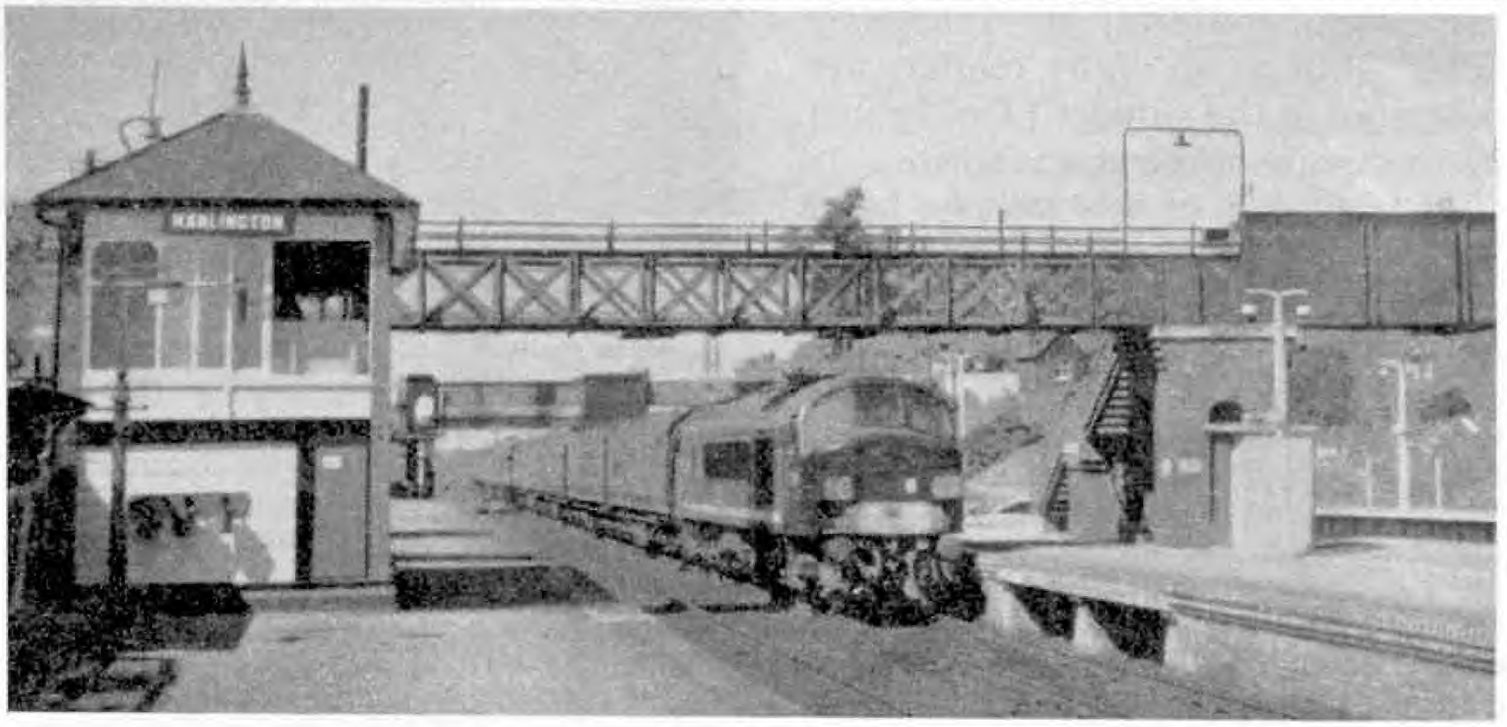
STEAM ON THE G.N. LINE

From the beginning of the summer services last June, almost all the express and other main line passenger trains, together with all the faster freighters between King's Cross, Doncaster and beyond, were normally to be hauled by diesel locomotives, and, as already indicated in the *M.M.*, steam locomotives ceased to be rostered for any such duties south of Peterborough to or from King's Cross. Some Pacifics of classes A1–3–4 stationed respectively at Doncaster, Grantham or Peterborough have, however, since visited London from time to time and returned (on occasion as light engines) as substitutes for diesels, also on a few special passenger trains, on parcels or trains of miscellaneous character. Class 9 2–10–0s have also appeared on goods or van trains. On one of the latter, during July, I saw No. 92182, shown in one of the accompanying illustrations, pass Hitchin at speed during the afternoon ahead of the Deltic-hauled *Flying Scotsman*. A B1 4–6–0 terminated there with a slow freight from Peterborough.

The lower photograph on page 458 was taken just before the last regular steam workings ceased. These duties included, among many good performances, haulage by an A3 or A4 on the important *White Rose* express, non-stop from Doncaster to London on Mondays to Fridays. Incidentally, *Isinglass*, seen in the picture, and originally one of the second series of Gresley Pacifics built nearly 40 years ago, appears in our top illustration in present-day modified form, in a Yorkshire setting. In my *Railway Notes* for July last I also featured this engine in picture and story, as many readers will remember.



An impressive view of fast freight on the move near Brookmans Park, from a photograph by J. Wyndham. Class 9 2–10–0 No. 92182 is heading the train.



One of the up Midland "Manchesters" speeds through Harlington on its way to St. Pancras behind Type 4 Peak class diesel No. D92. Photograph by J. A. Fleming.

What was, perhaps, my final regular express journey behind a veteran A3, somewhat the worse for wear, was with No. 60050, *Persimmon* as far as Peterborough aboard the 4.5 p.m. King's Cross –Leeds train with "11-on" or just over 400 tons gross. The start was fairly vigorous and a maximum of 80 m.p.h. was touched after passing Hitchin to time in the 37 minutes then allowed. Following a long repair slowing, performance tailed off slightly and so was not quite up to the high standard still forthcoming, until this last summer at any rate, from some of the class.

EXCITING MIDLAND RUN

One day last June I joined the fastest ordinary express (apart from the diesel *Midland Pullman*) from Manchester to London. From Leicester the quickest-ever timing of 94 minutes applied for the final 99 miles to St. Pancras, a rather sharply-graded route. The busy 10-coach restaurant-car train weighed about 370 tons in all, headed by Peak class No. D60.

After leaving Leicester nearly two minutes late, three severe speed reductions within the first 23 miles had to be made past drainage, bridge renewal and track repair works. When passing Kettering at 70 m.p.h. only 58 minutes remained for 72 miles if we were to reach St. Pancras punctually at 4.0. I wondered whether it could be done by this new-style 2,500 h.p. locomotive.

An absolute record dash—for me—passing Hendon 65 miles, within 50 minutes, averaging 78 m.p.h., with maxima up to 89 and minima well over 70 upon the two main climbs, would certainly have permitted it, as we were through West Hampstead with only four miles to go, just after 3.54. Unfortunately the terminal lines were not quite ready, so there were slowings, then a short stop for signals. St. Pancras was reached at 4.3, in 95 minutes from Leicester. Allowing for delays, we had averaged 71 m.p.h. from there. We had been five minutes late starting from Derby, and from there an actual mile-a-minute mean speed was sustained overall to London. Scheduled departure time from Manchester Central was 12.25 p.m.

TRACKSIDE NEWS

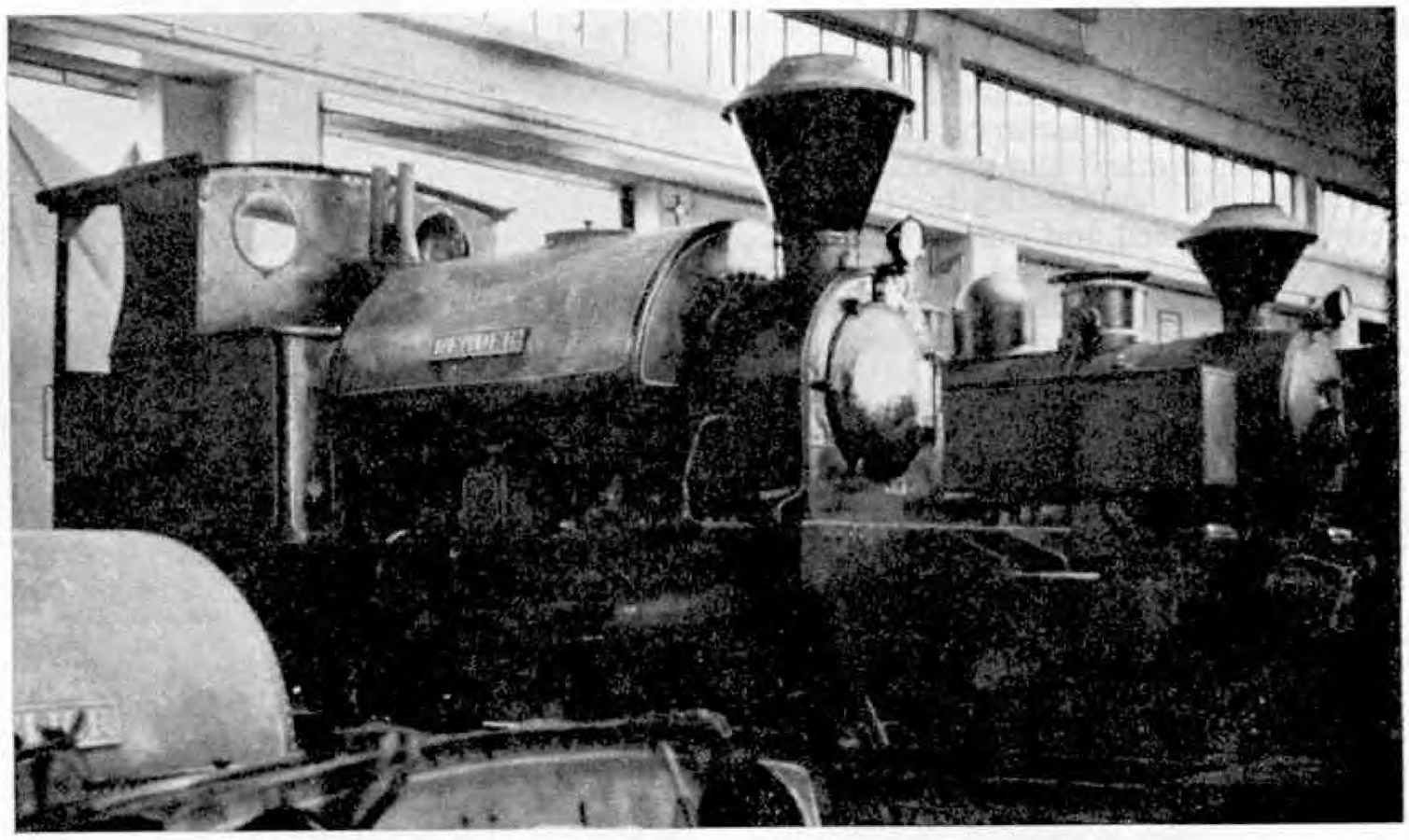
By "PLATELAYER"

Industrial Locomotives

SINCE this series of articles was inaugurated last May, many readers and representatives of various societies have sent me an enormous amount of information and photographs concerning narrow gauge and industrial locomotives. Originally I did not intend including this type of material in "Trackside News", but as so many readers are interested in the subject I feel I must try to devote some space to it.

The fascination of light railways lies, I think, in the charm of the locomotives and the eccentricity of the operational methods. Narrow gauge railways also have a similar sort of fascination, for those who enjoy the unusual, for their diminutive rolling stock and meandering permanent way is swiftly gaining large support in the railway world. The Festiniog Railway is an excellent example for, as many of you will know, it assumes a ledge-like existence for five or six miles of its route, during which it twists tortuously round mountain sides, to show passengers some of the most magnificent scenery in Wales.

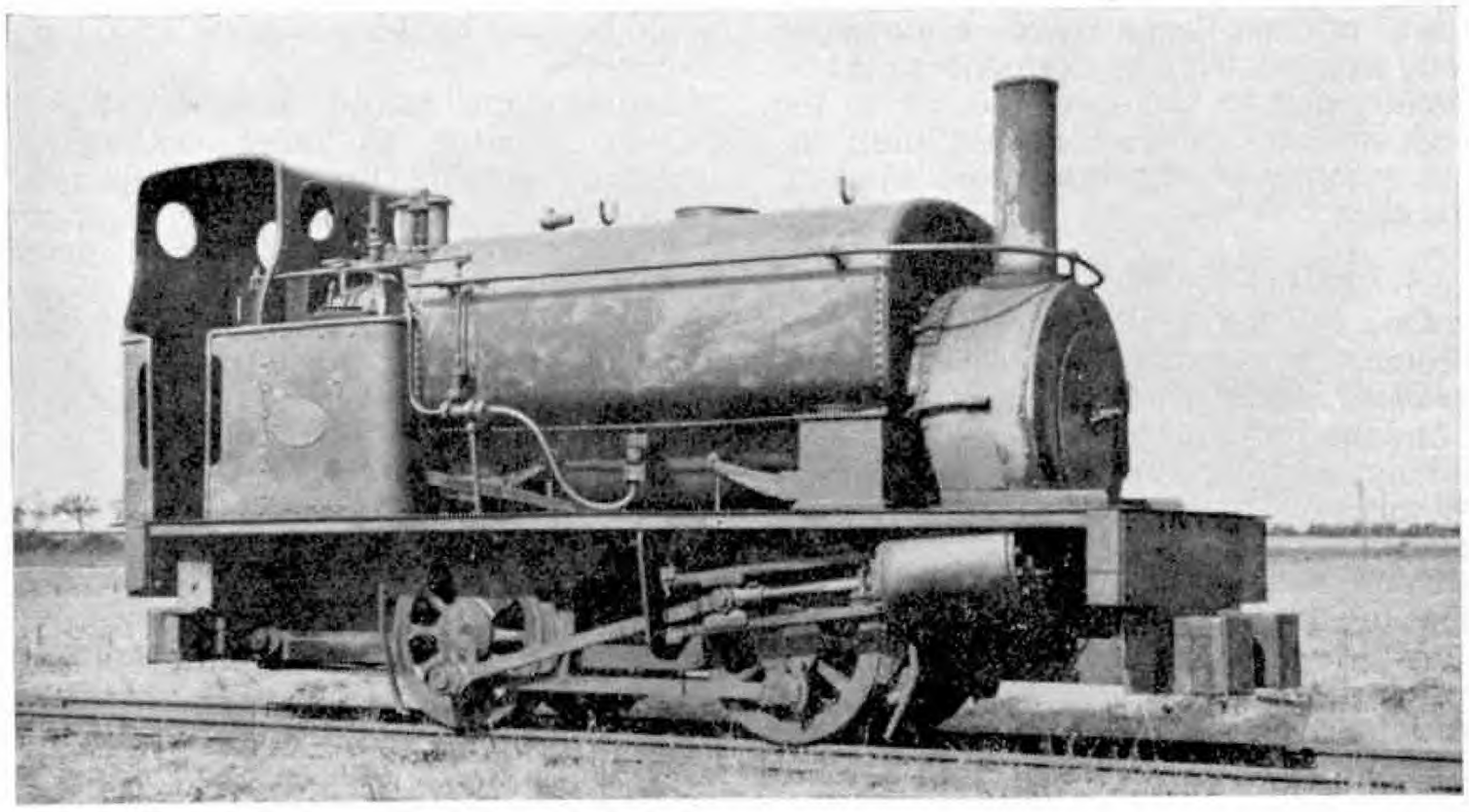
In this issue, and probably in the next, I intend to show a wide variety of steam locomotives, belonging to a number of railways, both industrial and narrow gauge. It may surprise many of you to learn that the total number of steam locomotives in service on privately-owned railways compares favourably with the number of steam locomotives that came into British Railways' possession on Nationalisation. And so it will be realised that there is immense scope for study for those people whose interest lies in the steam engine. It was to cater for the large interest in this facet of railways that the Birmingham Locomotive Club was formed in 1949. This club produces a large number of handbooks giving details of most of the industrial locomotives in service in Great Britain, and it is to this society that I am indebted for supplying two of the photographs in this article.



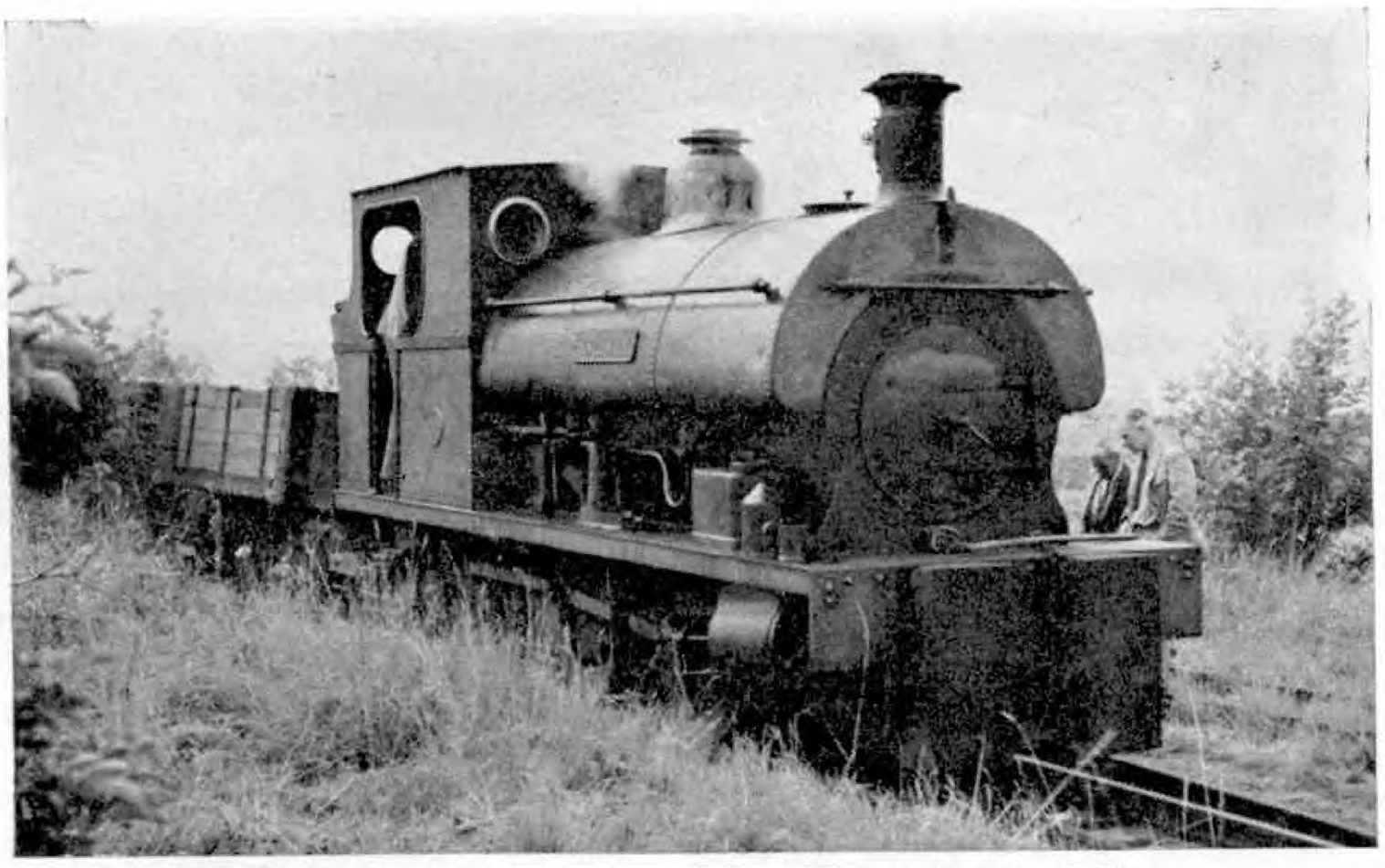
The two locomotives shown above belong to the Bowater's Paper Mills narrow gauge railways. This company also owns a standard gauge railway on which a privately-owned locomotive runs.

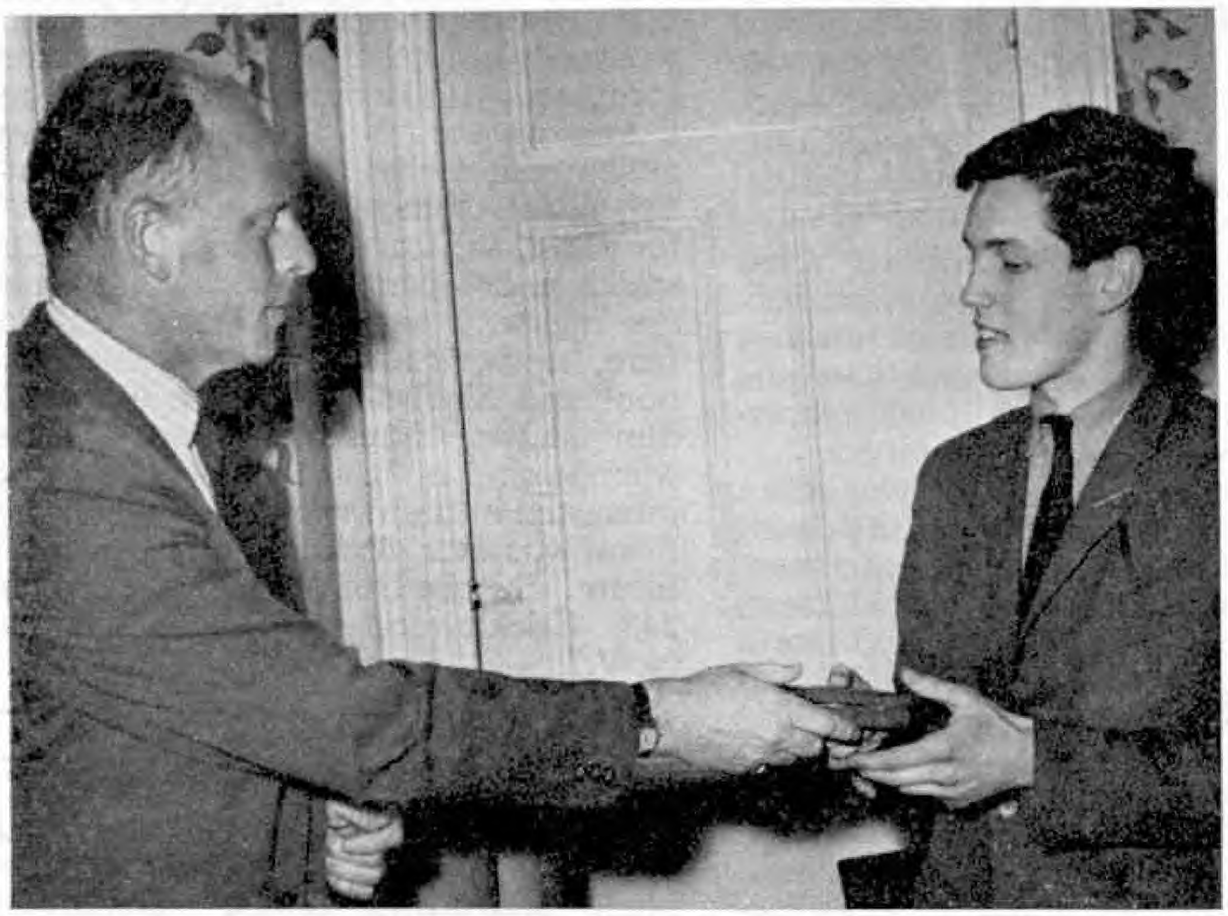
The first illustration shows two of the locomotives owned by Bowater Paper Mills at Sittingbourne, Kent, in June 1963. The photograph was taken inside the maintenance shed, where other locomotives are stored. The railway on which the locomotives operate is built to the 2 ft. 6 in. gauge. An interesting feature of the locomotives is the American-looking chimney, or "stack", on top of the smokeboxes. These are fitted to prevent sparks flying out of the chimney and possibly setting fire to the surrounding countryside, as often used to happen with many British locomotive exhausts. The locomotive on the left of the picture is *Leader* which was built by Kerr Stuart and Company in 1905 for two foot six inch gauge, her original works number being 926. Bowaters also owned a little standard gauge track, on which ran a number of privately-owned engines. At the present time, however, only one is owned.

Seen in the illustration below is one of the numerous types of locomotive to be found on the ironstone railways in the Midlands. This picture, and the top photograph on the opposite page, were taken by Mr. L. W. Perkins, who is a member of the Birmingham Locomotive Club (Industrial Section), during an enthusiasts' visit to the Scaldwell Ironstone Quarries.



The second and third photographs show two locomotives belonging to Staveley Minerals Ltd. This company owns a three foot gauge railway at Scaldwell Ironstone Quarries. These are the two illustrations supplied by the Birmingham Locomotive Club (Industrial Locomotive section) who recently ran a special excursion over the section of track owned by that company. Photograph number two, which was taken by Mr. L. W. Perkins, shows an 0–4–0 on the above system, built by Hudswell Clarke & Co. Ltd., in 1900, and numbered 573. Its former name was *Handy Man*. Our third picture also shows one of the steam locomotives belonging





Another locomotive—this time "Scaldwell" — seen by the members of the Birmingham Locomotive Club during their trip.

At the conclusion of his marathon journey over the Scottish Region of British Railways, 18-year-old Robin Dowson of Orpington receives a guard's watch from Mr. R. B. Reid, District Passenger Manager, Glasgow.

to this railway. This engine was built by Peckett & Sons, Ltd., in 1913, its works number is 1316, and it is named *Scaldwell*. The photograph, also from the camera of Mr. Perkins, shows *Scaldwell* with a train of wagons waiting for a final run. The Scaldwell Ironstone Quarries were once one of the many ironstone railways to be found in the district. Some are still active, but their numbers have been considerably depleted in recent years. Road transport has caused some to disappear; in other cases complete closure of the quarry has been the cause.

* * * *

Robin Dowson, an 18-year-old Orpington schoolboy, who travelled 3,300 miles in one week on the railways in Scotland was later presented with a guard's watch by British Railways. He worked out a sequence of journeys embracing practically every railway line north of the Border. And the cost was £6 6s.—the price of a second class Freedom of Scotland "Silver" ticket—which allows seven days unlimited travel on all lines in Scotland. The cost of travelling worked out at one penny for every two and a half miles.

The Travelling Schoolboy set out at 7.30 p.m. on Monday, August 19, aboard *The Aberdonian* sleeping car train from King's Cross. He reached Fort William early on Tuesday morning, and visited Mallaig before travelling to Queen Street Station, Glasgow.

Wednesday morning saw him in Aberdeen, and after journeying via Keith, Forres, Aviemore, Elgin and Inverness he caught a sight of the Cuillins of Skye from Kyle of Lochalsh.

On Thursday he went back again to Inverness, via Dingwall and north to Wick aboard the *Orcadian* express. A short trip to Huntly via the picturesque Tillynaught route was included before the sleeper left for Stirling. On Friday, Connel Ferry, Ballachulish and Stirling were visited—then Robin was carried straight across Scotland to Dunfermline and over the Tay Bridge to Dundee. Then on he went to Aberdeen from which he caught an 8 a.m. Saturday departure to travel on the Royal Deeside line to Ballater.

Back in Aberdeen again, Robin caught a train to the north-east fishing ports of Fraserburgh and St. Combs, then he was off again to Edinburgh Waverley. From Princes Street Station he reached Glasgow Central Station at 11.11 p.m.—with nineteen minutes to spare before catching a sleeper south.

On Sunday morning—at twelve minutes past two—Carlisle was the next stepping-off point, this time to Edinburgh Waverley, Aberdeen and on to Inverness on the fast diesel service. An hour in Inverness, then Robin set off back again to Glasgow for the 11.40 p.m. train south. At this stage Robin still had to travel on the railways in the south-west of Scotland, so he was in Carlisle again at twelve minutes past two on the morning of Monday, August 26, and after a three-hour wait, headed for Dumfries, Kirkcudbright, Castle Douglas, and a look at Stranraer before making for Glasgow. Finally, leaving Scotland at 5.30 p.m. on the Monday, he headed south again—this time all the way to London Marylebone.

* * * *

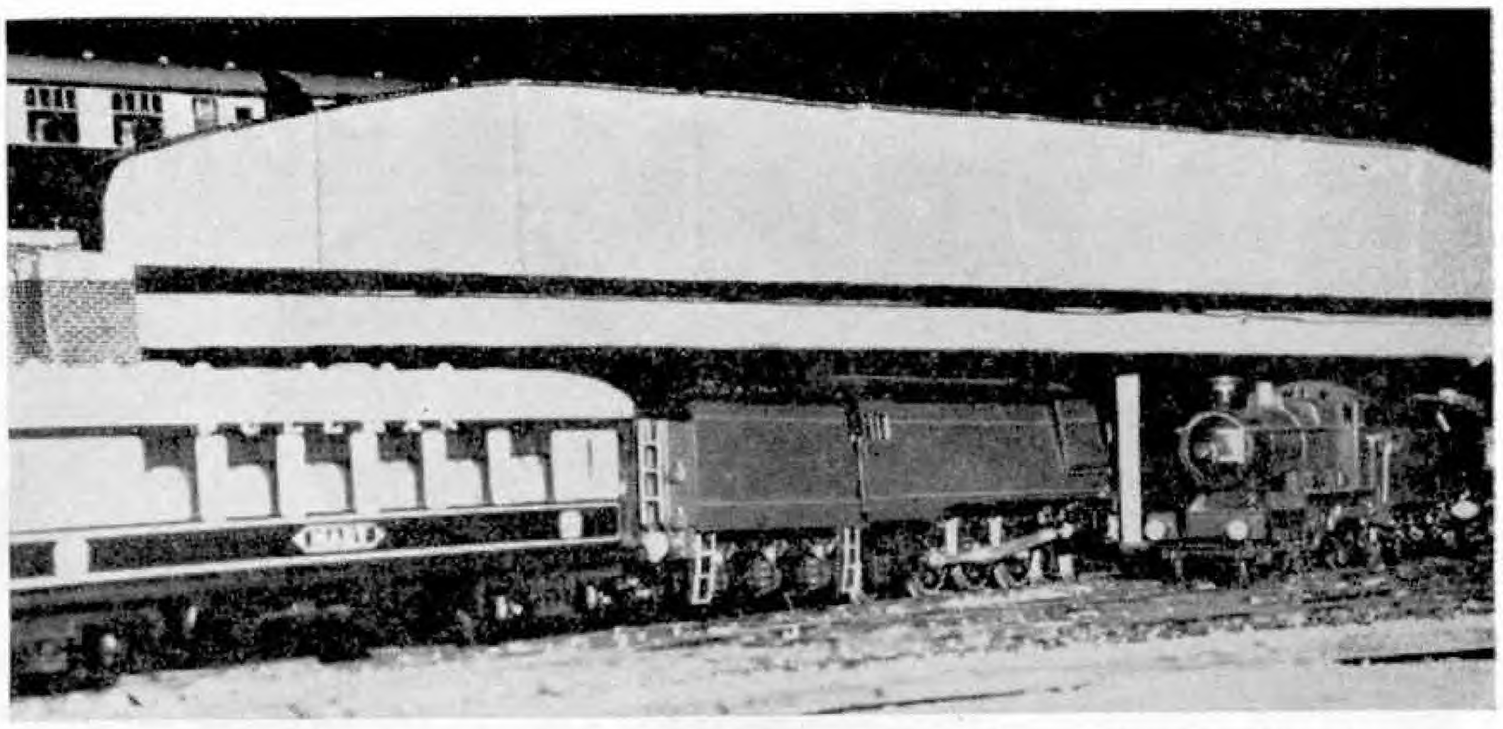
British Railways and the St. Andrew's Ambulance Association have co-operated in providing a new first-aid room at Glasgow Central Station. This is the only one of its kind in Scotland. It is sited near the entrance to Platform 11 and is equipped to deal with any casualty, both passenger and staff. Included in the room is a couch, adjustable lighting, and first-aid cabinet. The ambulance room will be staffed from 9 a.m. until 10 p.m. on weekdays, and 10 a.m. until 9.30 p.m. on Sundays, by volunteer members of the St. Andrew's Ambulance Association.

* * * *

As many of you will know, the cuts in passenger services proposed by Dr. Richard Beeching include most of the former Great Central Railway main line stations—in fact, those between Aylesbury and Nottingham Victoria; northward to Woodhouse Junction (Sheffield) and onwards to Mansfield and Worksop. Stations from Woodford to Banbury, Leicester Central and Nottingham Victoria are also among those to be closed. An association, known as the Great Central Association, has been formed to restore the entire Great Central main line for both express and local goods services, and for express and inter-city passenger train services. The cost of the venture is expected to be about £100,000, but the Earl of Lanesborough, who is president of the association, expects that a profit could be made within two years by operating diesel railcars and by keeping fares as low as possible.

Another result of the Beeching Plan is the possibility of an association to operate the Carlisle to Silloth Railway, in the event of passenger services being withdrawn.

ROUND THE SOCIETIES



This scene, taken from the Newbury Model Railway Club's 00 layout, shows a "Merchant Navy" hauling a train of Pullman coaches under the overbridge, while "City of Truro" passes in the opposite direction.

READERS who wish to join any of the organisations whose activities are outlined below should contact the Secretary of the Society concerned and *not* the *Meccano Magazine* Offices.

CHATHAM & DISTRICT MODEL RAILWAY CLUB

The Chatham and District Model Railway Club continues to meet twice weekly at its Rochester headquarters. Members are putting the final touches to the extensive 00 gauge layout, the operating of which follows correct prototype practice. A TT layout is in course of being designed, and construction will begin this autumn. The club's first semi-public exhibition was held recently and attracted visitors from London and several of the Home Counties. Visits to local items of interest are also arranged for members, as are film and slide shows and lectures. Further details can be obtained from the Hon. Sec., Mr. R. Ratcliffe, of 15 York Road, Rochester, Kent.

R. & E. R. PRESERVATION SOCIETY LIMITED

The Ravenglass and Eskdale Railway is one of the few narrow gauge railways still operating in Britain, its existence today being due to the Preservation Society, which was formed when the line was threatened with permanent closure. The society is now a limited company and the line is operated by the Ravenglass and Eskdale Railway Company Limited, in which the society has a financial interest. Apart from providing financial help from time to time, the society strives to make the railway more widely known. Some members also assist the permanent staff in maintenance, and in operating the railway during the season.

Whether or not you have travelled in "T'laal Ratty" you may wish to help by becoming a member of the society. Members are entitled to free travel on the railway when a public service is operating. For further details please contact Mr. A. G. Langley, of Parkside, Rueberry Drive, Seascale, Cumberland.

THE BIRMINGHAM LOCOMOTIVE CLUB

The Birmingham Locomotive Club Industrial Locomotive Information Section was founded in 1949 as an offshoot of the Club itself. Since that date the I.L.I.S. has grown into a national organisation with several hundred members.

A series of Pocket Books has been produced giving details of past and present industrial locomotives listed under owners and divided up on a geographical basis. Current alterations are supplied to a Records Officer from members' observations and official sources, and quarterly bulletins are issued to members so that Pocket Books may be kept up to date. During the last year a magazine, *Industrial Railway Record*, has also been produced.

Periodic visits are made to organisations owning industrial locomotives, and special trains have been organised on the larger systems.

On August 17 last, through the courtesy of Staveley Minerals Limited, about 100 members had an opportunity to travel over the 3 ft. gauge line at Scaldwell Ironstone Quarries, prior to the closure of the system. An illustration appears in this month's "Trackside News".

The B.L.C.—I.L.I.S. welcomes new members who are interested in both steam and diesel worked industrial or light railway systems in any part of the world. The Hon. secretary is Mr. Aidan L. F. Fuller, F.C.A., of 26 Ridgewood Drive, Harpenden, Herts.

THE LIGHT RAILWAY TRANSPORT LEAGUE

The Light Railway Transport League annual convention was held at Whitsuntide at Hagen, in Germany. From this centre members saw the latest developments in German tramways. There had also been a tour of Scandinavian tramways and light railways. The next overseas venture was to Belgium during a weekend in September. The programme included a visit to the Brussels Tramways, a tour on the "Vic'nal" Light Railway, and a visit to the Tramway Museum at Schepdaal. For those unable to travel so far afield, the usual programme of indoor meetings has continued. These meetings are regularly held in London, Birmingham, Leeds, Bradford, Manchester, Liverpool and Sheffield. They include talks, film shows, discussions and quizzes. Membership of the league is open to all interested in tramways and light railways; from whatever aspect, past, present or future. Details from the Hon. Secretary, 245 Cricklewood Broadway, London N.W.2.

BIGGLESWADE AND DIST. MODEL RAILWAY SOCIETY

The society is holding its third annual exhibition, on November 16 at the Drill Hall, Shortmend Street, Biggleswade, Beds. Times of opening are from 10 a.m. to 8 p.m. and the admission is 1/3d. and 9d. for children. It is hoped to exhibit as many working models as possible, including a live steam track, giving rides for children.

The club room at the Conservative Club, Biggleswade is open every Monday and Friday from 7.30, and all visitors will be welcome. Inquiries concerning the society or the show should be sent to the Hon. Secretary, Mr. M. J. Finding, of 77 The Rowlands, Biggleswade, Beds.

MONMOUTHSHIRE RAILWAY SOCIETY

November 10, visit to Motive Power Depots at Hereford, Worcester, Bromsgrove, Kidderminster and Stourbridge Junction; December 22, visit to Swansea Motive Power Depots.

In addition to these there are meetings on the first Saturday of each month, when lectures, film and slide shows, will be held. A monthly magazine and various other publications are also

available from: The Assistant Secretary, Mr. M. Eagleton, of 11 Canberra Crescent Newport, Mon.

ILFORD & WEST ESSEX MODEL RAILWAY CLUB

The entrance to the present headquarters consists of an ex-G.E.R. class E4 loco cab purchased from Stratford works as scrap. A large amount of land on the site is being prepared for the 7-inch gauge loco track, plus lawns and flower beds. The club has a very good workshop containing lathes, bench drill, and tools. A very large library containing books on railways, both model and prototype, in addition to most monthly magazines on railways and engineering subjects is available to members. The lecture room contains a bar for light refreshments. The club has sections for 00, EM, 00N3, TT, 0, and live steam. An annual exhibition at Ilford Town Hall is held every October.

New members are cordially invited, and should apply to the Hon. Secretary, Mr. R. Riddle, of 36 Vernon Road, Seven Kings, Essex. (Tel.: Seven Kings 5334.)

FURNESS MODEL RAILWAY CLUB

The club, formed in 1956, now has a membership of approximately 24, and has operating layouts in both 00 and TT scales. All the work and building is carried out by members. For further details please contact the Hon. Secretary, Mr. V. Tebay, of 114 Roose Road, Barrow-in-Furness, Lancs.

THE BIRMINGHAM LOCOMOTIVE CLUB

The Birmingham Locomotive Club offers members a complete programme throughout the year of visits to main line depots, works, and the opportunity to visit many interesting private railway systems. A comprehensive programme of indoor meetings, lectures, film shows, etc., operates during the winter months. For further details please contact the Hon. Secretary at 87 Sunnymead Road, South Yardley, Birmingham 26.

LANCASTER RAILWAY CIRCLE

The society was founded to further an interest in Britain's railway system by holding meetings and organising visits to places of railway interest. Anyone living in the North-West of England is welcome to join the society. We have **no** lower age limit. Membership fee for the latter quarter of 1963 is only 2/6 and includes delivery of our own monthly Newsheet. You are also entitled to attend meetings, borrow from the library of 300 books, and participate in our regular outdoor activities. The next visit will be to motive power depots in the Birmingham area on Sunday, November 3, 1963. For further details of the society, fixture list, and specimen newsheet, send a large stamped addressed envelope to Mr. M. Firth, 57 Cleveleys Avenue, Scale Hall, Lancaster.

LEICESTER MODEL GROUP

The October meeting will be held at the Charles Street Baptist Church, where the annual auction will be held. Anyone wishing to sell equipment is invited to bring it along. Apart from the above meeting, there are track nights every Wednesday and Friday at the clubroom, 5a Knighton Fields Road West (off Saffran Lane) at 7.30 p.m.

TWICKENHAM & DISTRICT MODEL RAILWAY CLUB

The club nights are every Friday at Richmond Community Centre, Room 7, Queen's Hall, Sheen Road, Richmond, Surrey. The subscription for junior members over 14, and under 18, is 15/– per annum. The fee for senior members is £2 per annum. The club's activities include layouts in 00 and TT gauges, visits to places of railway interest, talks, quizzes and auctions. The club is also planning an exhibition on Saturday, January 9, at All Hallows Hall, Twickenham. Further details may be obtained from the Hon. Secretary, Mr. P. Finch, of 83 Spring Grove Crescent, Hounslow, Middlesex.

THE MODEL RAILWAY CLUB

The club's activities for November 1963, are as follows: November 7, Track Night (L.M.S.R.). The club's 00 gauge layout will be in use this evening. November 14, Track Night (S.R.). November 21, Track Night—Rummage Sale. November 28, Track Night (G.W.R.).

Inquiries to the Hon. Secretary, Mr. D. A. Boreham, of 135 Mandeville Road, Northolt, Middlesex.

SCARBOROUGH MODEL SOCIETY

We now have rooms at 20 Trafalgar Road, Scarborough, and have sections modelling railways, boats, aircraft and road transport.

Meetings are held every Wednesday from 7 p.m. and, as the club has sole use of the rooms, other meetings are held at pre-arranged times. The railway section is building a large 00 gauge layout and the TT3 branch line layout is being extended. Prospective members are invited to call at the clubrooms any Wednesday evening, or contact the Secretary, Mr. Michael Hopkinson, of 45 Falsgrave Road, Scarborough, Yorkshire.

"4573" MODEL RAILWAY CLUB

The Hon. Secretary is now Mr. T. Fisher, of 13 Dednere Road, Marlow, Bucks. Meetings are held at that address every Friday at 7.30 p.m.. The club has started to build an outdoor 00 gauge system, which will probably be based on pre-war practice.

EAST HAM & DISTRICT MODEL RAILWAY CLUB

November 4, Setting up Night for: Leisure Time Exhibition at East Ham Town Hall, Bertaing Road, London E.6 (November 5–8, admission free); Nov. 11, Clearing up night; Nov. 18, Track Night (00/TT); Nov. 25, Track Night (TT/EM).

Further details are to be had on Monday club nights at St. Gabriel's Church Hall, Aldersbrook Road, Wanstead, E.11 (101 bus to the door) or from the Secretary, Mr. G. R. Lloyd, of 32a Goldsmith Road, London E.10.

STAFFORD RAILWAY CIRCLE

The Stafford Railway Circle will be holding their sixth annual Model Railway Exhibition in the Co-operative Assembly Rooms, Tipping Street, Stafford, on November 16 and 17. The exhibition will be open on the Saturday from 11.0 a.m. until 7.0 p.m. and on the Sunday from 1.30 p.m. until 6.0 p.m. Attractions will include at least six working layouts, in various gauges, film shows, photographic section, static displays, and displays by preservation and other societies. The admission will be 1/6d. for adults and 9d. for schoolchildren. Advance tickets can be obtained from the Hon. Secretary, Mr. A. A. Chatfield, of 6 Jerningham Street, Stafford on receipt of a S.A.E., and appropriate remittance.

HARLOW SOCIETY OF MODEL ENGINEERS

This society, formed about ten years ago, provides a club for the new town of Harlow, catering for model railway activities in 00/EM and TT/TM gauges. The society also has a live steam section, with a portable track 120 feet long for use at exhibitions. There is also the possibility of permanent track being constructed in 2½ inch, 3½ inch and 5 inch gauges. The society also owns a live steam locomotive in 5 inch gauge.

Meetings are held every Wednesday and Friday at "The Barn", First Avenue. The Wednesday meetings are devoted to the live steam section which has talks on a wide variety of engineering topics. The steam locomotive is also occasionally run. The Friday meetings are intended for the construction of the portable 00 and EM layouts. It is hoped that the TT section will have its own layout in due course.

Prospective members are welcome to attend and should contact the Secretary, Mr. B. H. Harriot, of 126 The Hoo, Harlow, Essex, for further details.

(*Another Report on page 489*)

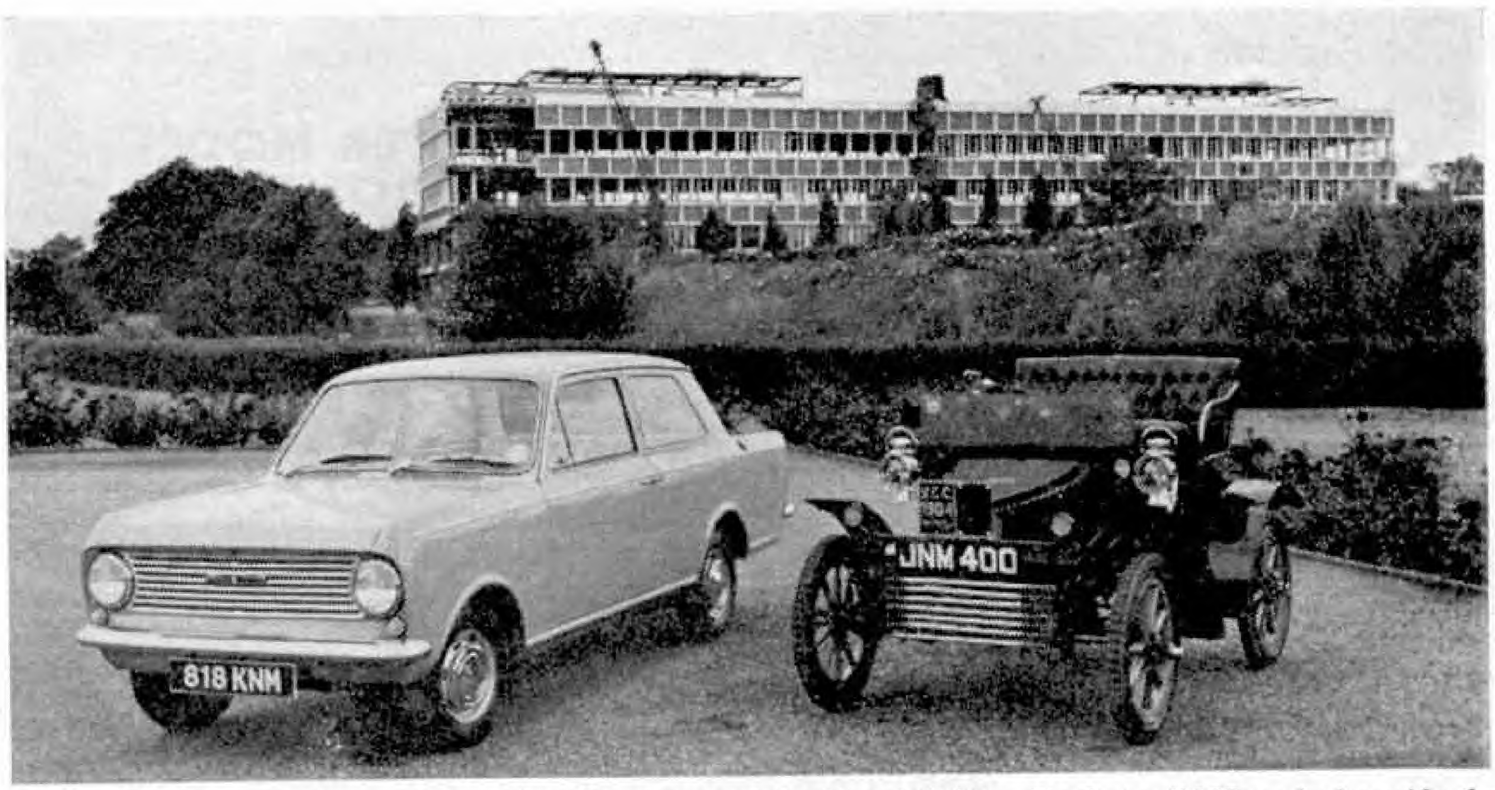
CORRECTION

In the September issue of this series we gave the address of the Secretary of the Western Model Railway Society, Mr. D. F. B. Kevan, B.Sc., A.R.I.C., as 53 Woodhall Gate, Pinner, Middlesex. His address is, in fact, 35 Woodhall Gate, Pinner, Middlesex.

ROAD AND TRACK

By Jerry Ames

A FORD GRAND PRIX ENGINE?



Sixty years of motoring are spanned by this picture of the Vauxhall Viva De Luxe (1057 c.c.) alongside the 1904 Vauxhall two-seater (1029 c.c.). In the background is the company's new Engineering Centre, scheduled for completion early next year. Picture by courtesy of Vauxhall Motors, Ltd.

WELL, that's it! Jim Clark's Italian Grand Prix victory makes certain he will take over the Champion's laurels from Graham Hill at the end of the year. Jim's splendid Grand Prix record this season includes five wins and a second place out of seven races. He also gains the Manufacturers' World Championship for Lotus while for Coventry Climax, who supply the engines, this is the third time their power units have helped to bring the World Championships to Britain. Three more grandes epreuves still remain to be run, the Grands Prix of U.S.A., Mexico and South Africa, but they cannot affect the present World Championships, although they could prove extremely useful for testing next season's cars and engines.

I understand Ford in Detroit have built and tested a new Grand Prix engine to Formula One dimensions and have now sent it to Dagenham for further development. I believe it to be a twin overhead camshaft V–8, but so far have had no confirmation from the British end of Fords. However, it makes interesting speculation for the future.

* * * *

It had to come, that Austin version of the Morris 1100. Mechanically the newer model follows the current Issigonis pattern, but has rather nicer seating, a better facia, with strip-type speedometer and, of course, a typical Austin radiator grille. Like its elder brother, the Austin 1100 has a top speed of 78 m.p.h. to give 70 m.p.h. cruising and a fuel consumption around 33 m.p.g.; praiseworthy features include Hydralastic all-independent suspension, sealed cooling, and disc brakes at the front. Drive, of course, is to the front wheels. Leather trim is an optional extra, modestly priced at only £12. Next year I hope to see better and more powerful versions of this design, but I think 1963 will largely be remembered by the majority of motorists for some of the interesting smaller family vehicles produced.

* * * *

We have already had Rootes 80 m.p.h. Hillman Imp, with single overhead camshaft 875 c.c. engine at the rear, four-speed all-synchromesh gear box. A very good little car it is, showing a great deal of original thinking that works well in practice. Now it is the turn of Vauxhall to introduce a small car, their first since pre-war days.

I have already covered quite a mileage in several versions of the Vauxhall Viva and felt thoroughly at home, both on motorways and over some of the more winding sections of the Welsh mountains. Its excellent handling is an eye-opener and shows how conventional suspension designs can be carried a stage further to provide the kind of roadholding that was once thought only possible from all-independent suspension. Under heavy braking a little tramping of the rear axle became evident, but I do not think drivers will find this on production models.

The Vauxhall Viva has a 1057 c.c. four-cylinder engine at the front; drive is to the rear wheels through an exceptionally good four-speed all-synchromesh gear box of new design. Like all the controls it is beautifully positive, light in action and the synchromesh is unbeatable, however quickly you change gear. One of the chief features about this car is its good power-weight ratio and remarkable acceleration to make overtaking safe and easy; it will go from 0 to 50 m.p.h. in less than 13½ secs. which is far better than the average full four-seater family saloon of its size with single carburettor engine. Maximum speed is 81 m.p.h., third gear takes it to 68 m.p.h. and provides plenty of power for easy hill climbing. Normally petrol consumption is between 35 and 42 m.p.g., according to how hard you put your foot down.

A combined body-chassis structure ensures low weight with strength; the two-door body, with very easy access to the rear seats, bears a family likeness to the Victor and presents a pleasing line. A thick coat of bituminous compound completely seals the underbody, wheel arches and other parts and the top colour finish breaks new ground with a lacquer that is highly resistant to all forms of attack, yet I am told does not need constant polishing and shines with mirror-like finish after just hosing down. Only four points need greasing, at 30,000 mile intervals.

At its low price the new Vauxhall Viva is bound to be in tremendous demand, especially as it has such sure-footed handling and good braking; front discs with servo are available as an optional extra. The Vauxhall Victor range including the VX 4/90 now has a larger 1594 c.c. engine to give faster cruising and higher maximum speeds with greater acceleration.

KNOW YOUR CAR—No. 2 VAUXHALL

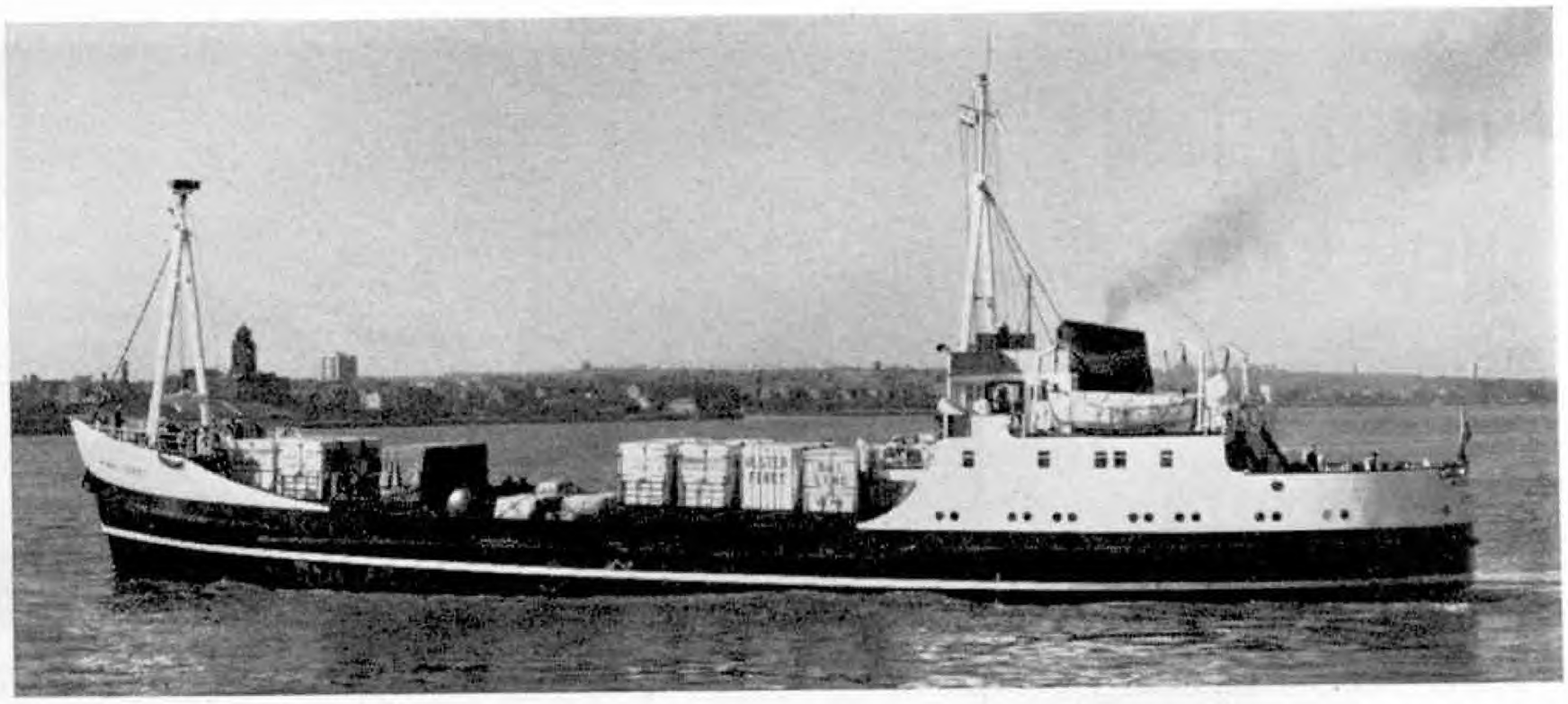
Appropriately enough, this month's historical outline concerns Vauxhall. The veteran you see alongside the modern Viva was built in 1904 at the Vauxhall Ironworks in South London to the design of Marine Engineer F. W. Hodges employed by the company. Power unit was a 5 h.p. single-cylinder engine, an unusual feature for those days was its front and rear coil spring suspension. Tiller steering was a less desirable feature.

In 1905, the firm moved from London to Luton and two years later a separate company was formed to concentrate on building cars. A distinctive feature of all Vauxhalls from 1905 until 1961 has been the attractive side flutes extending from the bonnet to radiator. They were inspired by an ornately-carved wardrobe owned by one of the directors, who decided it would make a splendid design symbol for his cars.

A milestone in Vauxhall history was the 20 h.p. four-cylinder tourer designed and built at short notice by assistant chief engineer Laurence Pomeroy, specially for the R.A.C. 2,000 mile Trial of 1908, where it was a tremendous success. A modified version later distinguished itself in the Prince Henry Trials on the continent and in the Coupe de l'Auto races; in 1910 a 3-litre Vauxhall was the first car of its size to achieve 100 m.p.h. Further modifica-

(*Continued on page 487*)

DOOR TO DOOR — BY SEA



Seen here about to leave Liverpool for Ireland is the "Wirral Coast", built last year. Note the bi-pod masts. Picture: Elsam, Mann & Cooper, Ltd. Liverpool.

MANY readers, both young and old, will have seen the containers used by the railways for transporting goods from "door to door", splendid examples of which are to be found in the Hornby-Dublo catalogue. You will recall that a container can be loaded at factory sidings or placed on a road vehicle to be driven to a railway yard, there transferred to a flat railway truck and then sent on its journey. Should you be aware that British Railways also own many ships you will not be surprised to learn that they operate this type of service across the sea. One ship so engaged is the *Container Venturer*.

For obvious reasons, it is the smaller cargo units that are packed in this manner. There are several advantages to this scheme—it is a safeguard against pilfering and damage, it maintains perishables in a fresh condition and speeds transit by obviating excessive handling. All go a long way towards promoting a happy relationship between consignor, consignee and the shipowner.

The containers, some of which are insulated and have capacities of about 800 cubic feet, are usually taken to and from the docks by lorry. There they are parked on the quayside or in a large transit shed served by overhead travelling cranes to await shipment. Alternatively, they may be transferred directly to and from the ship's hold by dockside cranes. Most of the ships on duty with this form of cargo come within the coaster-liner class for they are normally on regular scheduled passages, such as Liverpool to Belfast or Preston to Larne. By this system it only requires a few hours to discharge and load again, in fact it is possible for both operations to take place simultaneously so that a rapid turnround is secured.

Now, there are quite a number of specially-designed container ships, but when this service first began existing vessels were adapted for use. A prerequisite was a large unencumbered hatch, possessed by most coasters, and these vessels are still used alongside their more distinguished sisters. It is likely that any coaster could carry a few containers, even on deck, but a specially-built one like the *Goodwill* is designed to take as many as 55 standard-sized units. Eighteen are stowed on each of the two 120 ft. decks while, weather and other circumstances permitting, a further nineteen can be accommodated on the top deck.

Internally, there is a system of trolleys on rails in the two-deck hold and by this means the containers are moved. Externally, no visual characteristic assists identification, except perhaps if one has

(*Continued on page 489*)

COASTER COMMENTARY

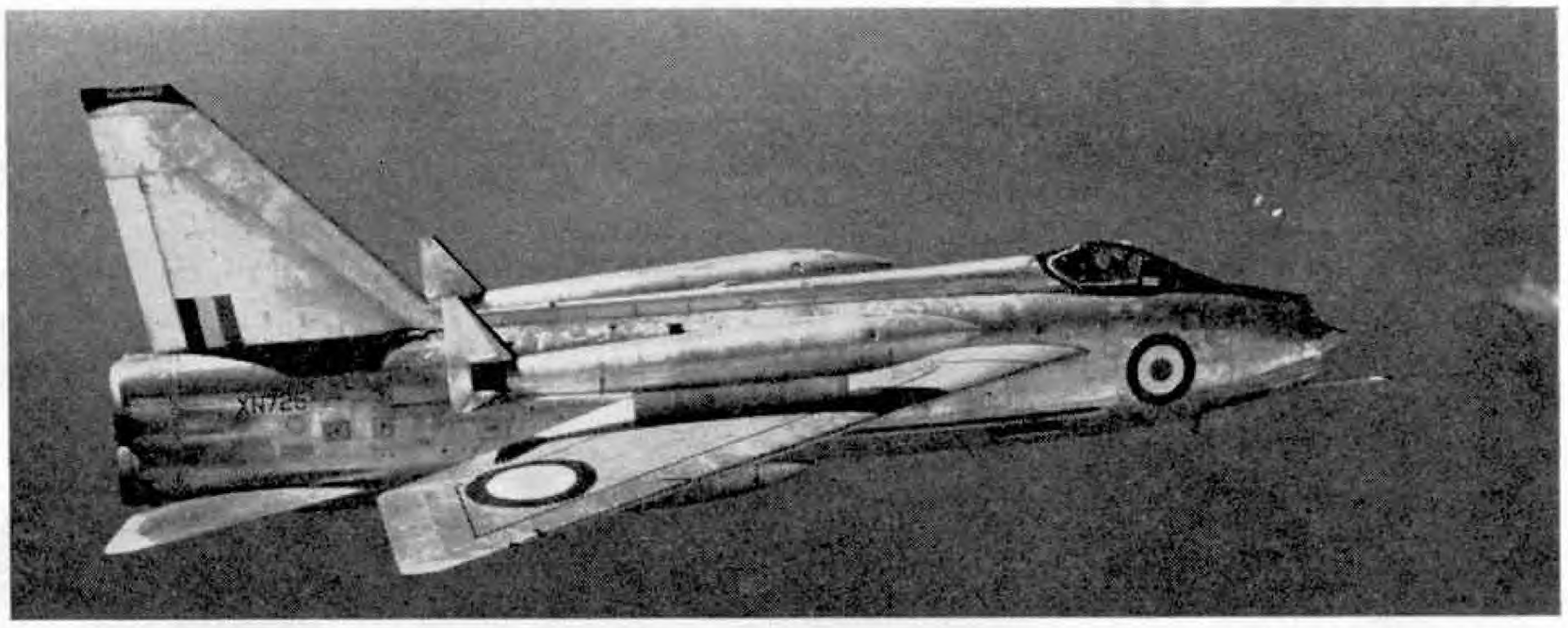
By ROBERT GORE

Below (left). This picture by the author shows the German vessel "Elfi Breuer", of 499 tons, with a deck cargo, about to enter Preston Docks from the River Ribble. (Right). Some idea of stowage in the hold can be gained from this illustration by J. & S. M. Browne, of Larne.





NOW BRITAIN'S NEW FIGHTER CAN TRAVEL FURTHER



THE illustration reproduced above is the first to show the unique overwing long-range fuel tanks that can be carried by Britain's new English Electric Lightning F.Mk.3 fighter. When fitted with these tanks and a probe on the starboard wing for refuelling in flight the Lightning can be ferried non-stop at high speed to any overseas base where it is needed. Earlier Lightning F.Mk.1s have already been flown non-stop from Britain to Cyprus by refuelling in flight from Vickers Valiant tanker-planes.

Soon to enter service with R.A.F. Fighter Command, the Lightning F.Mk.3 will be capable of intercepting any bomber in service anywhere in the world, no matter how high the bomber flies. In bad weather, or at night, it can fly under automatic control from the ground, with the help of a computer system known as Fire Brigade, and designed by Elliott Brothers. This "robot brain" receives radar information on the position of the target, works out the best interception course, and even warns the Lightning's pilot to return to an airfield other than the one from which he took off, if his fuel supply begins to get low.

Proof of the capability of the Lightning F.Mk.1, now in large-scale service, is that it has intercepted Lockheed U–2 high-flying reconnaissance aircraft of the U.S.A.F. during normal training flights over the United Kingdom. So far as is known, no other fighter has ever got within range of a U–2 at its full operating height. The Lightning F.Mk.3 flies even higher and faster than the Mk.1, and is armed with two of the new Red Top homing missiles. These can be fired at the target from any angle; the earlier Firestreak missiles carried by the Lightning F.Mk.1 have to be launched from behind the target in order to home on the hot exhaust from its jet-engines.

Top picture: The new English Electric Lightning F. Mk. 3 fighter with overwing fuel tanks for long-range ferry flights. Below: The Curtiss-Wright X–19A VTOL research aircraft, with "radial lift-force" propellers in take-off position.



AIR NEWS

By John W. R. Taylor

WHAT, NO PIANO?

When the 116-strong National Youth Orchestra of Great Britain set out on a ten-day tour of Poland and Switzerland last September they created a transport problem that might have daunted a lesser airline than B.E.A. There was no difficulty in packing the youngsters themselves into an airliner, but their luggage included seven double basses, eleven cellos, two harps and a tuba!

Troublesome Passengers

Angry passengers invaded the flight deck of a cargo aircraft recently, and might have caused serious trouble if the pilots had not opened the cockpit air vents, creating such a blast of wind that the troublemakers were blown back into their own cabin.

The passengers were not human but a shipment of bees which managed to escape from their container in flight and buzzed up front to explore their unfamiliar surroundings. Having blown them back into the main cabin, the aircrew shut the interconnecting door and refused to leave the flight deck after landing until a beekeeper had persuaded the insects to leave quietly.





Left: A Lockheed JC–130B Hercules of the 6593rd Test Squadron, U.S.A.F. retrieving a Discoverer satellite in mid-air. The squadron is based at Hickam Air Force Base, Hawaii. Above: The prototype Dinfia Guarani II turboprop transport, built in the Argentine.

Fortunately, the B.E.A. fleet includes the big double-deck Vanguard, one of the few types of aircraft in the world capable of accommodating an entire orchestra, complete with instruments and baggage. So, while the young musicians ate their lunch in mid-air somewhere over Eastern Europe, their precious instruments travelled just as snugly inside theVanguard's 1,360 cubic feet underfloor cargo holds.

WRIGHT'S WINGLESS WONDER

To be strictly factual, Curtiss-Wright's new X–19A VTOL research aircraft, shown in the illustration on the previous page, is not wingless. It has two wings, one behind the other, but they are so tiny that in flight it appears to have little visible means of support.

The X–19A's ability to fly with such small wings results from the use of four special tilting propellers, mounted at each wingtip. Known as "radial lift-force" propellers, they tilt upward as shown in the picture to function as helicopter rotors for vertical take-off, landing and hovering. At a safe height, they are gradually tilted to a normal forward-facing position, and the aircraft builds up speed as they do so.

Unlike other types of convertiplane, the X–19A does not have wings large enough to provide all the lift needed to support it in high-speed flight, but the special propellers take care of that. Their wide glass-fibre blades continue to provide lift, as well as forward thrust, even when they are tilted right down. This makes the six-passenger X–19A so efficient, without the drag of large wings, that it is expected to have a speed range of from 0 m.p.h. while hovering to 460 m.p.h. in forward flight.

The four propellers are driven by a pair of 2,200 h.p. Lycoming T55 shaft-turbine engines mounted inside the fuselage. Interconnecting shafts ensure that either engine will continue to turn all four propellers if the other should stop.

CATCHING SATELLITES

When the U.S.A.F. announced some years ago that it was stationing a number of transport aircraft in the Pacific to catch satellites returning from space, few people expected the operation to be successful. It is, admittedly, possible to track orbiting satellites precisely, and they do not travel very quickly when, after re-entry, they make the last few miles of their descent at the end of a parachute. But to expect to have a large transport waiting in just the right place at the right time, and to be able to snatch the parachute cables with a trapeze structure trailed behind it, seemed a trifle optimistic.

However, on September 16, 1960, the crew of a C–119 Packet aircraft succeeded in snatching the 85 lb. Discoverer 14 satellite in mid-air, and two months later Discoverer 17 was retrieved in the same way. This was clearly an improvement on having to search for satellites in the sea, in order to recover their instruments, and the U.S.A.F. replaced the Packets with faster, longer-range Hercules turboprop transports. These aircraft have proved so successful that the aerial recovery of military satellites is now considered routine. It keeps the crews of the Hercules aircraft busy, as there have been about 100 satellite launchings from Vandenberg Air Force Base, California, since they took over from the Packets in September 1961. They have brought the "snatch" technique to such a fine art that they frequently manœuvre to within twelve feet of a descending satellite.

ARGENTINIAN AIRLINER

Argentine Airlines are such good customers for British aircraft, with a large fleet of Comets and Hawker Siddeley (Avro) 748s in service, that we hear very little about transport 'planes designed in that country. This situation may change soon, for Captain Hector Eduardo Ruiz, of the state-owned Dinfia aircraft manufacturing organisation, has just produced the prototype of a fine little airliner which will almost certainly be built in large numbers.

Known as the Guarani II, this aircraft is powered by two French-built 930 h.p. Turbomeca Bastan VI turboprops and carries from ten to fifteen passengers at a cruising speed of 280–305 m.p.h. The prototype flew for the first time on April 23 this year and, as can be seen from the top right illustration on this page, it has very pleasing modern lines.

Nineteen more Guarani II's have already been ordered. Their manufacture will be speeded by the fact that 20 per cent. of the airframe is identical with that of the piston-engined I.A.35 Huanquero training and transport aircraft, of which 100 are being built for the Argentine Air Force.

PAID TO CRASH AIRLINERS

America's Flight Safety Foundation has just been given a 168,000-dollar contract to crash two airliners. This may seem a rather startling job, especially for an organisation devoted to improving safety in the air, but it is all in a good cause.

The airliners are a Stratocruiser and either a DC–7 or Constellation that have been retired from service. and they will not even have to take off. Instead they will be accelerated on the ground, under remote control, so that the right wing of each aircraft first hits two telegraph poles. The left wing will hit an embankment. The fuselage will begin by striking a sloping ramp that will duplicate the conditions experienced in a crash landing under control. It will then come up against a steeper ramp, providing more severe crash conditions.

While this is happening, instruments and cameras in and on the aircraft, and stationed round the test area, will record the effects of the rough treatment. In this way, the Federal Aviation Agency hopes

(*Continued on page 489*)

Motor Show Model is a Dinky Triumph

How The Secret Was Kept

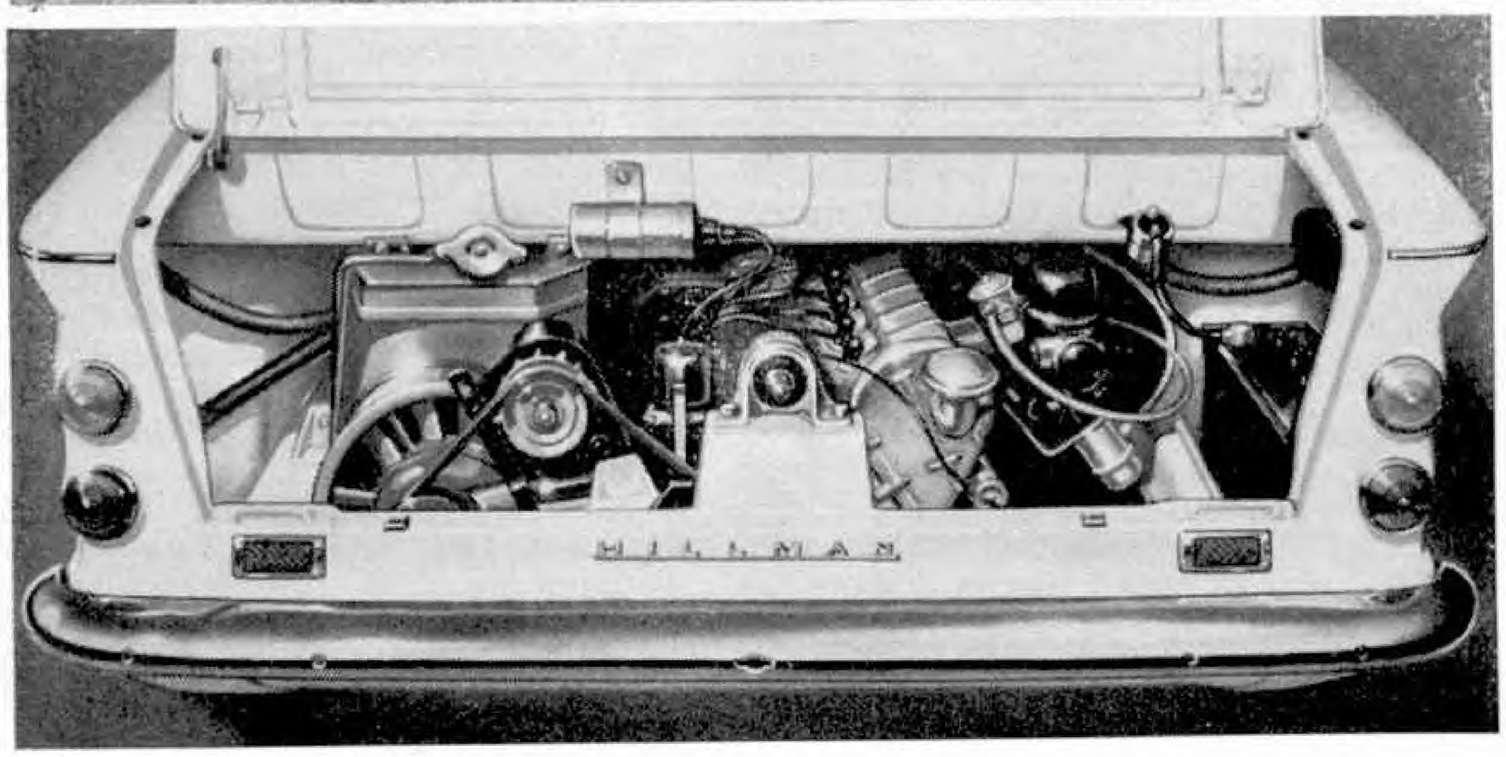
EACH year, the Motor Show at Earl's Court, London, is the display window for car manufacturers the world over. Makers from virtually every car-producing country on earth have a stand there and, on it, they usually present their latest model or models. Indeed, many firms — particularly those from Britain—keep their newest creation a closely-guarded secret until the Show, then let it burst on the public overnight. Often a rumour that a particular company will be releasing a new car is heard beforehand, resulting in a feverish air of expectation with everybody wondering what it will be like.

As you now know, one of the surprises at this year's Motor Show was the sensational new Triumph 2000. You will not know, however, that as the actual car was being produced under a cloak of secrecy, we at Meccano, working in the closest conjunction with the Standard-Triumph Company of Coventry, were producing a miniature version of it to be released simultaneously with the prototype. You will appreciate that many months of work must be put into preparing a model before it appears on the market, and the planning of our Dinky replica called for the interchange of most precise information between the Standard-Triumph Company and ourselves. It meant that long before the unveiling of the actual car some of its secrets had to be known to a few key men at Meccano Limited, and we take great pride in the confidence shown in us by the makers of this very fine new saloon. The new Dinky is, in fact, a two-way Triumph! Incidentally, although the car made its debut at the Motor Show, it will not be on sale to the public until January 8 next year.



A new and glamorous addition to the Standard-Triumph range, the Triumph 2000 (seen above), proved one of the hits of this year's Motor Show. The power unit is a smooth and powerful six-cylinder 1,998 c.c. engine, fitted with twin Stromberg carburettors. The 2000 is a four-door, five-seater saloon of monocoque construction. The graceful lines of its long, low and racy body are faithfully reproduced in the latest Dinky Toys model referred to on this page.





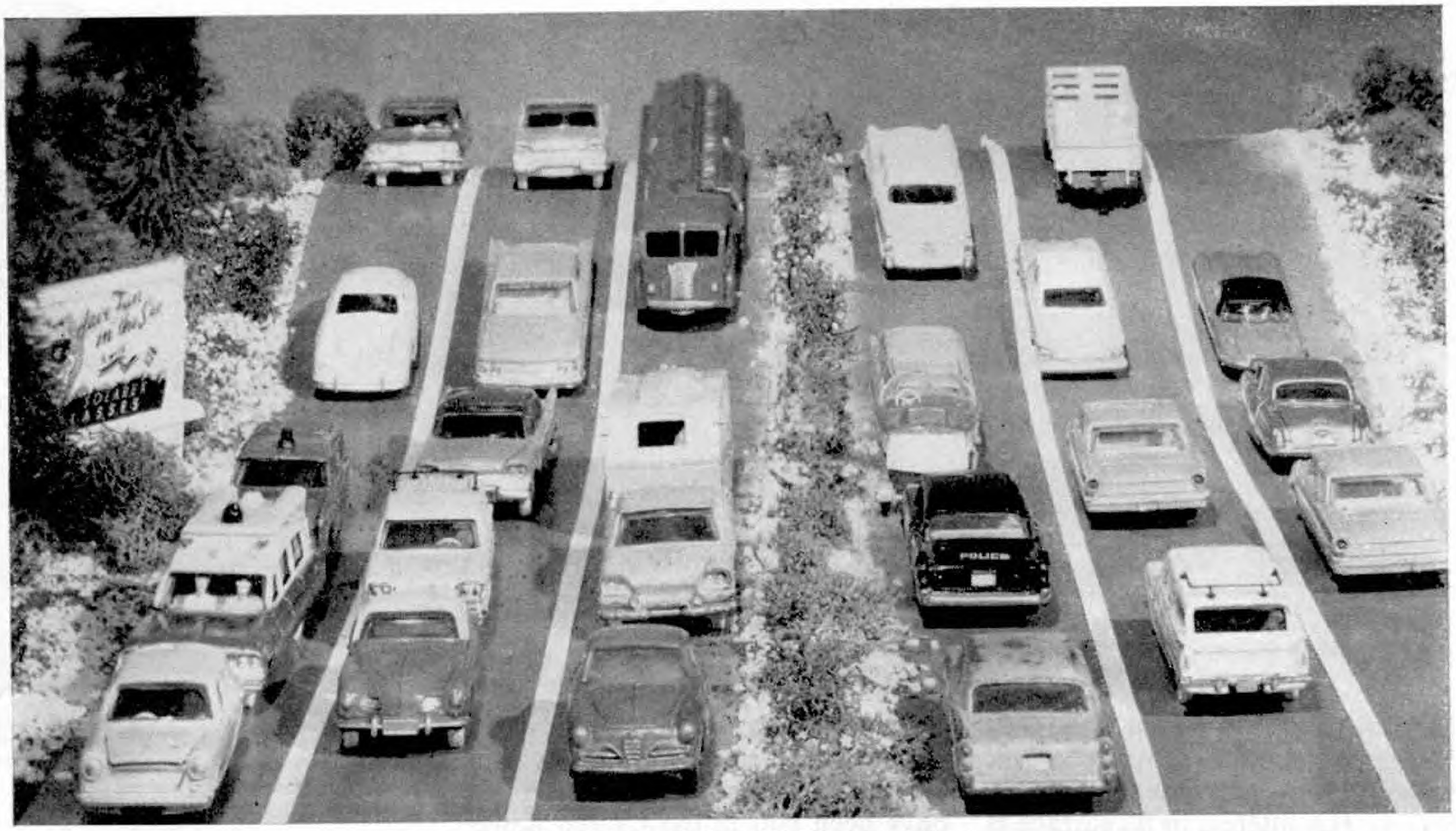
DINKY TOYS NEWS

By THE TOYMAN

Because of the secrecy surrounding the Dinky Toys Triumph 2000 I have been unable to photograph our model in time for this month's notes, but I have included an illustration of the prototype which you can see on this page. It is styled by Giovanni Michelotti of Turin, and is powered by a 6-cylinder engine of 1,998 c.c. capacity which develops 90 b.h.p. at 5,000 r.p.m., giving a top speed of 95 m.p.h.

It is the first British car in its class to have independent suspension on all four wheels, the front pair of which are fitted with disc brakes and the rear with 9-inch diameter drum brakes. If the all-round independent suspension adds to the comfort of the passengers, so also do the lever-

The Hillman Imp (top left) has a rear-mounted aluminium die-cast camshaft engine. All-independent suspension makes for superb handling. The Imp has no greasing points and is easy to service. (Below) A comprehensive view of the engine.



Kitchener–Waterloo, Ontario are twin cities with a combined population of about 100,000, located about 75 miles north-west of Toronto. Their local Motor League undertook a campaign to publicise highways and traffic signs for the benefit of the community, and good use was made of Dinky Toys, which are very popular in Canada. You can see how their traffic lanes were presented in the striking illustration shown above. This was forwarded to the "Meccano Magazine" by our Canadian office in Toronto, and we are indebted to the "Kitchener–Waterloo Record" for permission to reproduce the picture which was taken by Mr. H. W. Huehnergard, a staff photographer for that newspaper.

operated, fully-reclining front seats and the deeply-cushioned rear bench seat.

Overall dimensions are: wheelbase 8 ft. 10 in., front track 4 ft. 6 in., rear track 4 ft. 2⅜ in., length 14 ft. 5¾ in., width 5 ft. 5 in., height 4 ft. 8 in.

The Triumph 2000 is an up-to-the-minute vehicle designed specifically for all-round modern traffic conditions, having a high but practical top speed combined with vivid acceleration and the ability to move slowly in traffic without the necessity of constant gear juggling.

So much for the actual car. Now, what about the Dinky Toys replica? Numbered 135 in our sales list, it has all the standard Dinky fittings—Prestomatic steering, windows, seats, steering wheel, and 4-wheel suspension. In addition, however, it is equipped with two special features, and another one which is completely new to Dinky Toys. The first two are an opening bonnet, giving access to a beautifully detailed replica of the engine, and an opening boot containing two valises. The new introduction is a meticulously detailed dashboard, more realistic than any other previously fitted to a Dinky model. The instruments have been impressively detailed to give a most satisfying effect.

The new Dinky has a two-tone Polychromatic finish of ocean blue, with white top, while the internal "upholstery" is red.

I find myself now in a bit of a dilemma: I feel sure that the Triumph 2000 will be the pride of your collection, yet I am equally certain that our second new release this month will also exercise enormous appeal. I think our only solution is to say that this month we have two Number Ones. Anyhow, there is really no need for me to introduce this other Dinky to you—one glance at the illustration at the bottom of the opposite page will tell you that it is one for which you have all been asking. The Hillman Imp, for that is what it is, is manufactured in Scotland by Rootes

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This impressive array of miniature army vehicles seen in an effective natural setting includes Dinky Toys Tank Transporter with Centurion Tank; Missile Erector Vehicle with Corporal Missile; Military Ambulances, and Field Artillery Unit. Their enthusiastic owner is K. J. Hermann, of St. Heliers Bay, Auckland, New Zealand.

Rubber In Roads

By
LESLIE E. WELLS



From South Africa comes this illustration of rubberised slurry seal surfacing on the approaches and deck of Athlone Bridge. Durban is in the distance.

THE average motorist tends to regard a road as simply the link between his points of departure and arrival. His interest in its surface is usually aroused only when it is slippery or abnormally wet, or when his progress is hindered because repairs are under way.

Nevertheless, there are those who have given, and still give, a great deal of thought to road surfaces. And every motorist has reason to be grateful to these chemists and road engineers. Without them, motoring would be far less pleasant and much more hazardous than it is.

A vital element in road surfacing is natural rubber. This is now being used on an ever-increasing scale in almost every country in the world, while sections of rubberised roads have been laid in the United Kingdom, the U.S.A., Europe, Africa, Australia, Malaya, New Zealand and elsewhere.

Either in special powder form or as liquid latex from the tree, rubber can be blended into bitumen to form a homogeneous mixture. This blend, known as "rubberised bitumen", is created by a combination of heat and agitation. The proportion of rubber incorporated is generally no more than 2 to 5 per cent. of the weight of the bitumen. Nevertheless, this small addition effects a critical change in the characteristics of ordinary bitumen, the most noticeable being that the bitumen possesses a certain elasticity.

The inclusion of the rubber has other results of no little value to the motorist. The blend softens less readily in hot temperatures and is less brittle in frosts and under icy conditions. It also displays adhesive qualities of a high tenacity.

The elastic and adhesive elements will be readily appreciated by the motorist. On hot days, every road user has had the unpleasant experience of driving over a section of road which has softened and started to run. This liquified surface is picked up by the tyres; a rubberised bitumen is far less likely to give rise to this annoyance.

The motorist who has driven over a newly-surfaced road has suffered inconvenience, as well as danger, from chips rising from his wheels and showering about the car. A rubberised bitumen does not entirely cure this; it does, however, ensure that the number of rising chips is considerably smaller. And, if the motorist drives slowly, there will be virtually no rising chippings at all.



Rubberised bitumen being laid on Muswell Hill, North London.



This gyratory island on the A 47 near the Birmingham city boundary was surfaced in 1959. The subsoil strength was very low and rubber was, therefore, incorporated in the wearing course as an extra precaution against the effects of foundation movement.

In appearance, the rubberised road cannot be distinguished from any other kind of highway, nor are the rubberised roads, although they have definite elastic qualities, less hard to anyone who has the misfortune to fall on them. But the elasticity ensures the surface is more durable and has an appreciably longer life.

The rubberised road surface has proved itself most noticeably on those sections of road which are subjected to high degrees of stress. Such sections are bus stops, traffic roundabouts and unusually steep hills. It has also shown itself highly successful on roads where movement of the foundations is likely and where traffic is particularly dense.

The call for rubberised road surfaces is so great that it is proving difficult to cope with it—and this demand is growing all the time. This type of surface is meeting problems which no other blend or material has answered with anything like the same success.

At 12th Street, Altoona, Pennsylvania, a rubberised asphalt was laid over a 50-year-old cobbled surface on a gradient of more than one in five. The Spencer Street Bridge, leading to Melbourne Docks, and said to carry the heaviest traffic of any stretch of road in Australia, has also been given a coating of rubberised bitumen. The dressing, laid over the existing wooden blocks, has shown itself to be as durable and efficient as the experts claimed.

In London, Muswell Hill was given a rubberised surface dressing. Its top gradient happens to be 1 in 8.6. When the new surface was tested for braking, the report stated that it was "one of the safest in the wet ever encountered."

Rubberised bitumen is by no means new; indeed, it was first patented as long ago as 1844. Its use, however, until 1922 was limited to demonstrations with rubber-capped blocks. Then the first attempt to utilise rubber for roads was made on the Dartford–Gravesend road, an experiment in which rubber was broken down by heat to a substance resembling tar.

In 1924, a further experiment was undertaken at Bradford and then, in 1930, a special committee was formed to investigate the use of rubber in roads. Three years later, the Technical Research and Development of New Uses Committee of the Rubber Growers' Association began work on the same subject. Arising out of the work of the association, investigations were made into the use of rubber in tars at the Chemical Research Laboratories, Teddington. The Road Research Laboratory at Harmondsworth experimented with the mixing of rubber with bitumen.

In the early 1930's, experiments were undertaken with concrete blocks, capped with about half an inch of hard rubber. Lombard Street, in London's city area, was laid with these blocks. They were quiet under traffic, pleasant to walk on and very hard wearing, but their initial cost was too high for the blocks to be used generally. In addition they had the serious drawback that, when wet, they failed to provide sufficient wheel grip for modern braking needs.

In 1937, a well-known asphalt specialist, Mr. A. E. M. Dussek, laid a section of asphalt surfacing at Clifton Rise, in Deptford, South-East London. Incorporated in the aggregate were rubber granules. The surfacing was laid on a fairly steep slope, which, in earlier years, carried horse-drawn, steel-tyred traffic. Now one of the oldest rubberised roads in existence, it is reported as still in fine condition.

Only as recently as 1950 was serious investigation begun into the large scale use of rubber in bituminous road surfaces. Experiments were undertaken in the United Kingdom, U.S.A. and Europe.

It seems that rubber has already shown itself to be the best friend of the motorist in the various uses to which it is put in the making of his car. But its use in road surfacing is of equal importance to the comfort and safety of all vehicle users.

Britain's Biggest Rally

One hundred and fifty of the world's top drivers will compete in Britain's biggest rally, the Royal Automobile Club's Twelfth International Rally of Great Britain, which takes place this year between November 10 and 16. Among them will be the giant Swede, Eric Carlsson, the only man to win three times in a row. Carlsson, who has also won the Monte Carlo Rally twice, is likely to be competing against his wife, Pat Moss.

The rugged 2,200 mile road section will include 54 special stages over private land loaned by the Forestry Commission, the War Office and private owners. The winner will be decided on these stages, which will be linked by suitably-chosen roads avoiding towns.

GAMAGES MODEL BOOK

The annual appearance of *Gamages Model Book* is something to which all hobby enthusiasts look forward. They will certainly not be disappointed with the 1963–64 edition. It contains details of miniature electrically-powered roadway and race-track equipment, a wide choice of miniature railway material (including Hornby-Dublo) and a remarkable selection of aircraft models. A complete section is devoted to kits for the assembly of models of all kinds.

Constructional sets such as Meccano and Bayko are prominent, while the budding scientist is offered a wide range of experimental apparatus. Apart from purely catalogue material there is much information concerning railway, road and air records, famous trains, ships, aircraft, and so on. The catalogue can be obtained, price 1/– including postage, from Gamages, Holborn, London E.C.1.



This picture by E. G. Hodgkins shows several vehicles of the Black and White Motorways Fleet at Cheltenham.

CALLING ALL BUS SPOTTERS

The Coaching Station At Colourful Cheltenham

AN inspector pressed a bell. "The five minute bell," he explained, and five minutes later, exactly at two o'clock, he pressed it again.

By DAVID KAYE

Whistles blew, engines began revving up, an inspector moved out into St. Margaret's Road, Cheltenham to direct traffic, and two by two, as if under the orders of Noah himself, the coaches began to disgorge from the station to right and to left. The first away was Eastern Counties Bristol LS (LS 776) bound for Great Yarmouth, which it was not due to reach until 9.55 p.m. that night. Second away was Yelloways' brand new A.E.C. "Reliance" 4638 DK, which had called at Cheltenham en route from Rochdale to Torquay.

The rest followed, weaving in and out of the movable posts bearing destination boards—Black and White 179 for London (direct); Red and White UC 158 for London (via Oxford); UC 159 for London (via Reading) with UC 559 as relief; UC 259 off in the opposite direction to Cardiff, and UC 459 for Swansea; UC 958 for Aberdare, and UC 558 for Neath. Also Wales-bound were UC 1159 for Treherbert; UC 1059 for Blackwood; UC 658 for Tonypandy, UC 1458 for Carmarthen; UC 758 for Pembroke Dock; Black and White 192 to Aberystwyth, Black and White 184 for Ponterwyd, and Bristol Greyhound 2106 for Bangor. Incidentally, these "UC" series of Red and White are all underfloor-engined coaches. The last two digits in their fleet number are the year in which they entered service, and these are preceded by a serial number: hence UC 1059 is the tenth underfloor-engined coach delivered to Red and White during 1959.

This striking mass departure thrilled me, for yet more coaches poured out—Midland Red cars 3354, 4249, and 4785 (the last-mentioned a motorway express vehicle) for Birmingham; Black and White 223 for Nottingham; 176 for Coventry, and 178 for Leicester; 225 for Scunthorpe; United Counties 201 for Peterborough, Southdown 1104 for Eastbourne, with Black and White 167 as far as Worthing. Then emerged Black and White 241 for Pompey, with Royal Blue 2201 as far as Fareham. Royal Blue 1279 and 1284 were off to the Queen of the South (alias–Bournemouth), while Black and White 161 and 234 headed for George III's holiday resort, Weymouth. Paignton was to receive Ribble 1053 and Black and White 227, with Wessex SAE 951 as relief as far as its native Bristol. Finally, Southern National 1327 departed for Ilfracombe, and Royal Blue 2207 for Plymouth. Yes, I have come to the end of that Wednesday's departure "ZZ" list.

However, on the following day, when I interviewed Mr. Purvess, the Traffic Manager of Black and White, in his office overlooking the station, he told me that on the following Saturday, July 27, they were expecting 200 coaches, carrying a minimum of 7,000 passengers, to leave between midnight and 3.30 *a.m.*, and that a further 500 coaches, with at least 15,000 more passengers on board, would depart during the remainder of that day. He

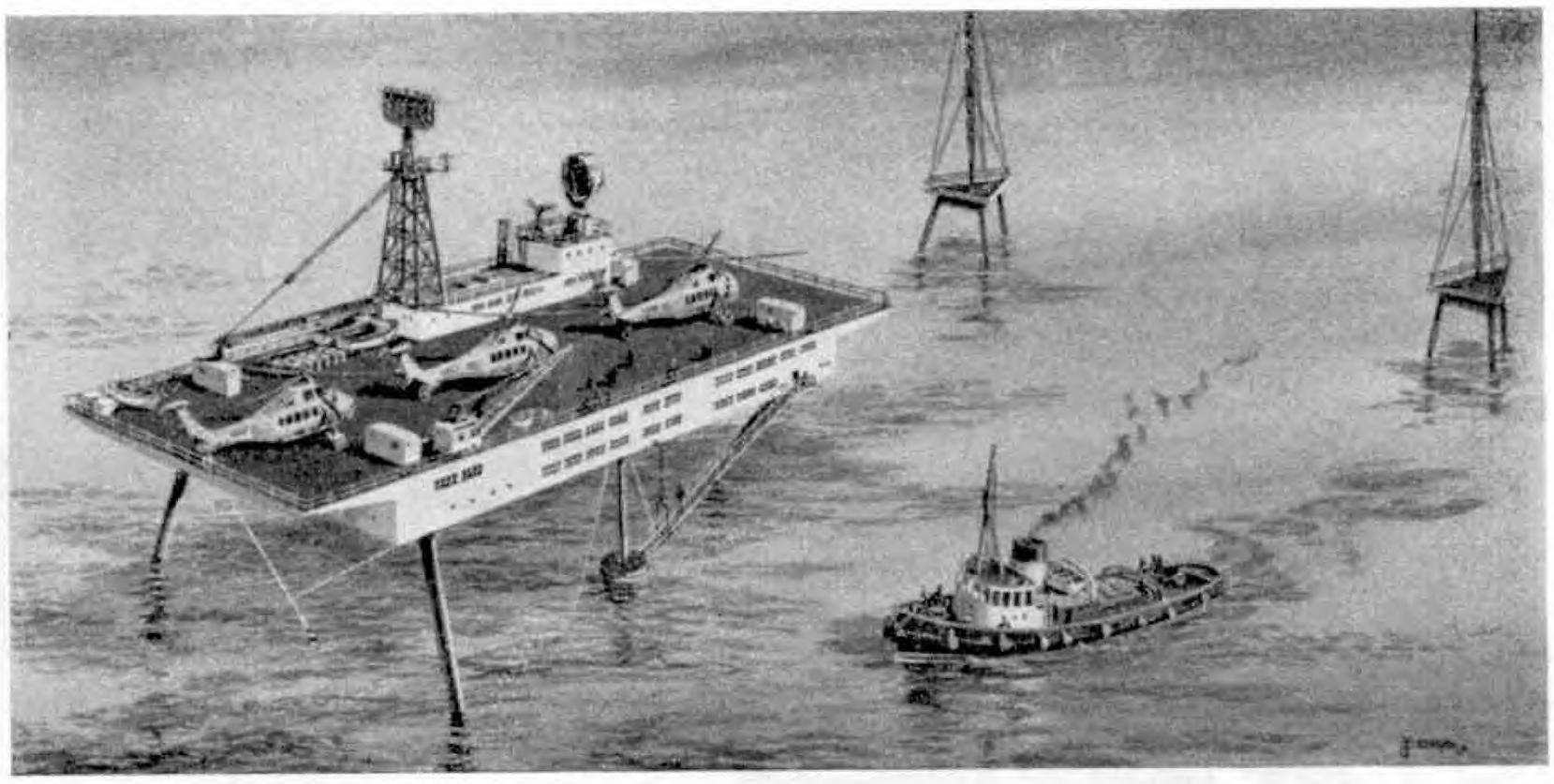
(*Continued on page 489*)

Black and White Fleet List

Year	*Fleet Nos.*	*Registration Nos.*	*Chassis*	*Body*
1951	129–138	KDF 980–89	Leyland PSU1/11	Willowbrook C33C
1951	139–142	KDF 990–3	Leyland PSU1/11	Willowbrook C37C
1951	143–148	KDF 994–9	Leyland PSU1/11	Willowbrook C33C
1952	149–158	LDD 990–9	Leyland PSU1/11	Willowbrook C37C
1953	159	MDF 484	Leyland PSU1/11	Willowbrook C37C
1954	160–175	NDG 160–175	Guy "Arab" LUF	Duple C37C
1955	176–187	PAD 176–187	Guy "Arab" LUF	Willowbrook C37C
1956	188–193	SAD 188–193	Guy "Arab" LUF	Willowbrook C37C
1957	194–203	SDF 194–203	A.E.C. Reliance	Willowbrook C37C
1959	204–8	WDG 630–4	A.E.C. Reliance	Roe C41F
1960	209/11	4209/11 AD	A.E.C. Reliance	Duple C41C
1960	210/12–6	4210/12–6 AD	A.E.C. Reliance	Duple C37C
1961	217–22	8217–22 AD	A.E.C. Reliance	Duple C37C
1962	223–31	6773–81 DD	Leyland PSU3/1R	Plaxton C47F
1963	232–41	4872–81 DF	Leyland PSU3/1R	Plaxton C47F

This Island Can Be Towed

Says
Ian S. Balderstone



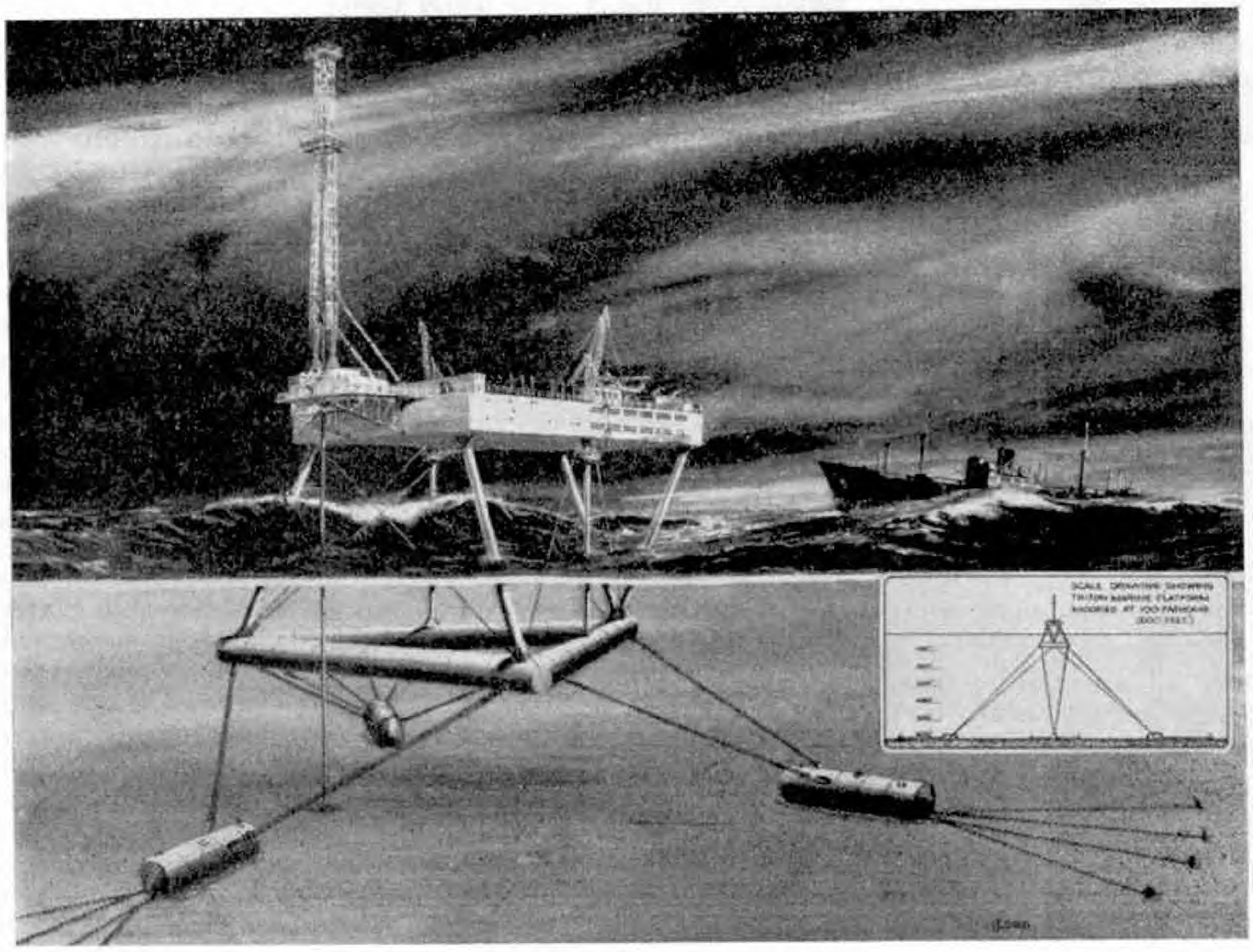
Artist's impression of a Triton Marine Platform operating as a helicopter landing platform. Also shown are two platforms rigged as radio operating beacons.

A RADICALLY new type of marine platform has been developed in Great Britain. This British-built steel island, known as Triton, has been developed by International Marine Development Ltd. in association with the shipbuilding firm of Cammell Laird & Co. Ltd., of Birkenhead.

Experiments have shown that the "Triton" platform has exceptional stability even under hurricane conditions and can be installed in water of depths of up to 1,000 feet and more. It is capable of carrying a payload ranging from 25 to 2,000 tons. Although undersea oil drilling was the original use for which the new platform was developed, it can also be used for carrying out undersea geological sampling—as, for example, that required for investigations regarding a possible Channel Tunnel. It is equally suitable for salvage or construction work in deep water and for the establishment of offshore radar, or optical beacons for air and sea navigation, helicopter landing sites, offshore ship terminals and processing plants.

Military applications include platform carrying offshore radar stations for missile testing ranges, or for defence, anti-submarine detection equipment and interference-free spaceflight monitoring and telecommunications systems. It is interesting to note that since Triton can be moored in water exceeding 100 fathoms—the depth at outskirts of the continental shelf—it is therefore much more versatile than the United States Air Force's "Texas Towers" which are limited to about 30 fathoms for anchorage.

In this illustration the Triton is envisaged as a drilling rig. The lower picture shows the tethering operation and the small diagram is a scale drawing of the platform moored at 100 fathoms (600 feet).



With other types of deep water platforms which have mostly been developed for undersea oil drilling, the limits of operation are about 120 feet. In most such systems, jacks or rams are used to drive piles or cylinders from a floating craft into the sea bed. They depend on the letting down of legs, or stilts, to the sea bed. Such techniques, as oil drillers have found out, become increasingly expensive at depths greater than 70–80 feet. The economic upper limit of such systems is about 120 feet providing subsoil conditions are suitable. This factor has governed the extent of undersea oil drilling on the continental shelves throughout the world. Geological predictions indicate the existence of far more extensive oil fields than those at present explored offshore, yet alone worked. On the military side, defence radar towers could, of course, be located more efficiently if greater freedom of site could be attained.

The operation of the Triton Platform is very simple. Legs can be replaced by taut cables, providing they are kept taut. A triangular buoyancy chamber built like a submarine hull carries the superstructure which is designed to ensure the minimum effect of both wave and wind motion.

The triangular shape ensures maximum stability both when the platform is towed to site with tanks "blown" and floating on the surface of the water, and when the chamber is below surface on site. On site, the buoyancy chamber is sunk to a depth of about 50–60 feet below sea level where wave motion is greatly reduced. The buoyancy of the chamber is controlled so that the cables are kept taut at all times. The lower ends of the cables are held on the sea bed by a series of sinkers held in location laterally by spaced anchors. The buoyancy of these weighted sinkers, which consist of cylindrical steel vessels divided

(*Continued on page 488*)

Attractive to build, fun to operate

MECCANO GIANT TOWER CRANE

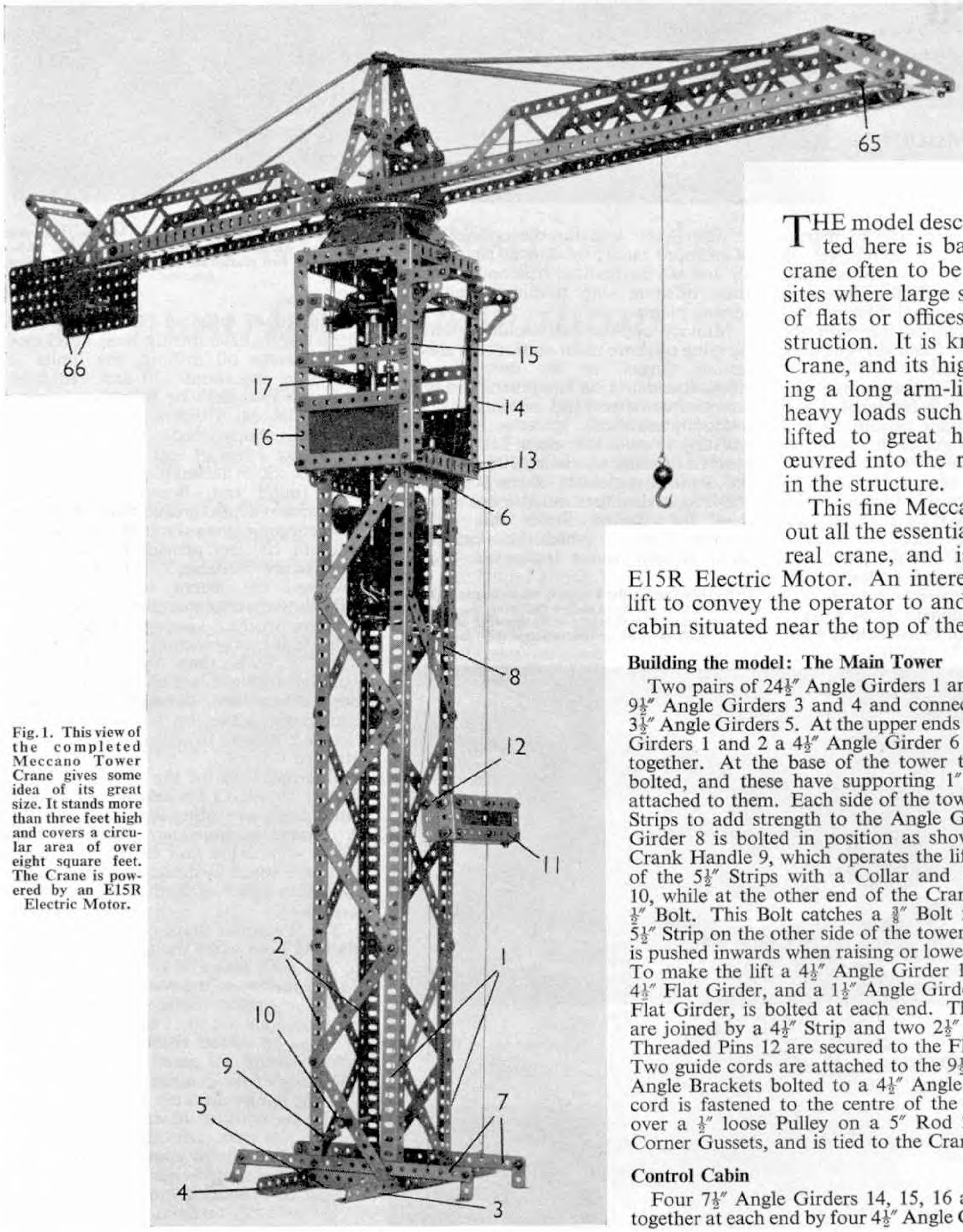


Fig. 1. This view of the completed Meccano Tower Crane gives some idea of its great size. It stands more than three feet high and covers a circular area of over eight square feet. The Crane is powered by an E15R Electric Motor.

By "SPANNER"

THE model described and illustrated here is based on a type of crane often to be seen on building sites where large schools, or blocks of flats or offices, are under construction. It is known as a Tower Crane, and its high tower supporting a long arm-like boom enables heavy loads such as girders to be lifted to great heights and manœuvred into the required positions in the structure.

This fine Meccano model carries out all the essential movements of a real crane, and is powered by an E15R Electric Motor. An interesting feature is a lift to convey the operator to and from his control cabin situated near the top of the tower.

Building the model: The Main Tower

Two pairs of 24½″ Angle Girders 1 and 2 are bolted to the 9½″ Angle Girders 3 and 4 and connected together by two 3½″ Angle Girders 5. At the upper ends of each pair of Angle Girders 1 and 2 a 4½″ Angle Girder 6 is used to join them together. At the base of the tower two 9½″ Strips 7 are bolted, and these have supporting 1″×½″ Angle Brackets attached to them. Each side of the tower is braced with 5½″ Strips to add strength to the Angle Girders. A 3½″ Angle Girder 8 is bolted in position as shown in Fig. 1. A 5½″ Crank Handle 9, which operates the lift, is mounted in two of the 5½″ Strips with a Collar and Compression Spring 10, while at the other end of the Crank is a Collar with a ½″ Bolt. This Bolt catches a ⅜″ Bolt fixed in the opposite 5½″ Strip on the other side of the tower. The Crank Handle is pushed inwards when raising or lowering the lift platform. To make the lift a 4½″ Angle Girder 11 is extended with a 4½″ Flat Girder, and a 1½″ Angle Girder, extended by a 1½″ Flat Girder, is bolted at each end. The 1½″ Angle Girders are joined by a 4½″ Strip and two 2½″×1½″ Flexible Plates. Threaded Pins 12 are secured to the Flat Girders as shown. Two guide cords are attached to the 9½″ Strips 7 and to two Angle Brackets bolted to a 4½″ Angle Girder 13. Another cord is fastened to the centre of the lift platform, passed over a ½″ loose Pulley on a 5″ Rod 25 journalled in two Corner Gussets, and is tied to the Crank Handle 9.

Control Cabin

Four 7½″ Angle Girders 14, 15, 16 and 17 are connected together at each end by four 4½″ Angle Girders to form a box,

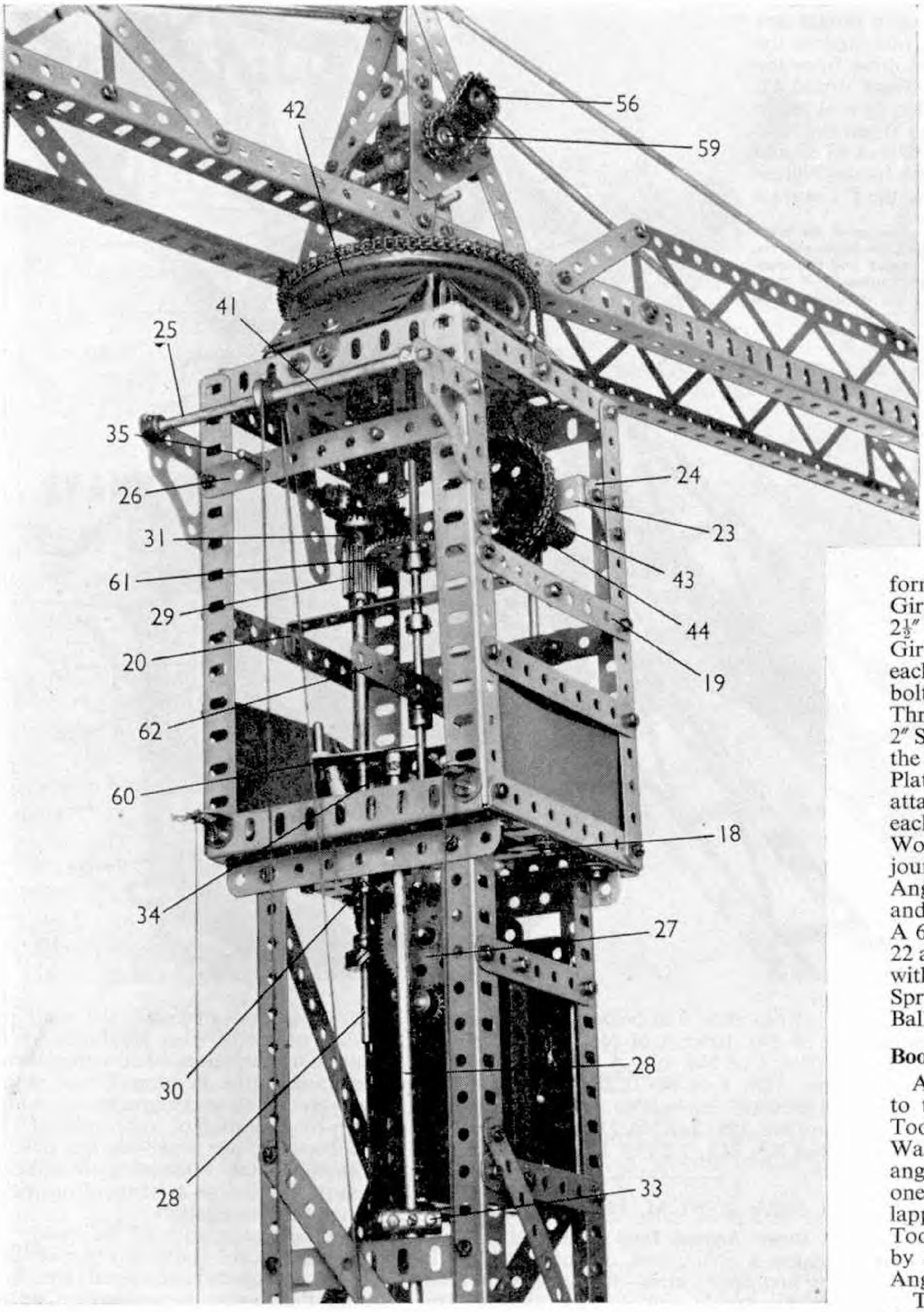


Fig. 2. The cab of the Crane, housing some of the gear assemblies used in the model. Hoisting and slewing are controlled from here.

and three of the sides of this are partly filled in by $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates and $4\frac{1}{2}''$ Strips. The control cabin is now bolted to the $4\frac{1}{2}''$ Angle Girders 6. Across two of the $4\frac{1}{2}''$ Angle Girders a $4\frac{1}{2}''$ Strip 18 is bolted. Two $4\frac{1}{2}''$ Strips 19 support a Double Angle Strip 20, and another $4\frac{1}{2}''$ Strip 21 supports the Trunnion 22. A $4\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 23 is attached to the $7\frac{1}{2}''$ Angle Girders by 1" Corner Brackets 24, and a $4\frac{1}{2}''$ Strip 26 is bolted in place through the fourth hole down of the Angle Girder. A $4\frac{1}{2}''$ Strip 26 (Fig. 2) is bolted in the position shown.

Motor Drive

An E15R Motor is attached to the main tower girders by two $3\frac{1}{2}''$ Strips. A $\frac{1}{2}''$ Pinion on its armature shaft drives a 57-teeth Gear Wheel 27 on a 3" Rod that carries at its other end a $\frac{3}{4}''$ Pinion, which in turn, engages on a 3" Rod. In the centre of this Rod is secured a $\frac{1}{2}''$ Helical Gear that engages with another $\frac{1}{2}''$ Helical Gear on an 8" Rod 28. This Rod is journalled in the Strip 18 and the Double Angle Strip 20, and is held in position by the $\frac{1}{2}'' \times \frac{3}{4}''$ Pinion 29 and a Collar 30. A $\frac{3}{4}''$ Contrate Wheel 31 is secured to the end of the Rod 28. On the Rod 32 is fastened a Coupling 33 with two $1\frac{1}{2}''$ Rods in its outer holes and a Threaded Pin on the Motor starting lever is placed between these $1\frac{1}{2}''$ Rods. A Crank 34 with Threaded Pin is secured to the upper end of Rod 32 and operates the Motor starting lever. On a 5" Rod 35 a $\frac{1}{2}''$ Pinion 36 and a $\frac{3}{4}''$ Sprocket Wheel 37 are secured. A loose Collar 38, placed between two fixed Collars, is attached to a $3\frac{1}{2}''$ Strip 39 by a nut and bolt through its centre hole, the nut being locked against the Collar 38. The end of the Strip is lock-nutted to an Angle Bracket bolted to the $4\frac{1}{2}''$ Angle Girder 40.

Ball Bearing Mounting

Two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates 41, bolted at 90 degrees to each other to form a cross, are fixed to the $4\frac{1}{2}''$ Angle Girders, the centre bolts also securing four $2\frac{1}{2}''$ Angle Girders extended by $2\frac{1}{2}''$ Flat Girders. To two of the Flat Girders facing each other two $2\frac{1}{2}''$ Angle Girders are bolted, and on to these is fixed the Ball Thrust Race Flanged Disc 42, with two 2" Screwed Rods and Nuts passed through the $\frac{1}{2}''$ Angle Girders and the $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates 41. A $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate is attached by an Obtuse Angle Bracket to each side. A 2" Sprocket Wheel 44 and a Worm 43 are now fixed to a 5" Rod journalled in the Strip 26 and the Double Angle Strip 23. The Sprocket Wheels 37 and 44 are connected by Sprocket Chain. A $6\frac{1}{2}''$ Rod 45, mounted in the Trunnions 22 and 46, carries a $\frac{1}{2}''$ Pinion that engages with the Worm Wheel 43, and a $\frac{3}{4}''$ Sprocket Wheel, which later will drive the Ball Thrust Race Toothed Disc.

Boom and Travelling Carriage

A Bush Wheel without set-screw is bolted to the underside of a Ball Thrust Race Toothed Disc and spaced away by one Washer on each Bolt. Two compound angle girders, each built from one $24\frac{1}{2}''$ and one $18\frac{1}{2}''$ Angle Girder (47 and 48) overlapped four holes, are bolted to the Toothed Disc. Braced Girders, supported by 3" and $3\frac{1}{2}''$ Strips, are attached to the Angle Girders as shown.

The centre triangular structure is built from four $5\frac{1}{2}''$ Strips 49, joined at the top by a Double Bracket. Each of the $\frac{3}{8}''$ Bolts securing the Double Bracket also holds three Rod and Strip Connectors to which the compound tie rods are held. Further Rod and Strip Connectors fastened to the Braced Girders support the other ends of the tie rods. The $5\frac{1}{2}''$ Strips 49 are braced by $2\frac{1}{2}''$, 2" and $1\frac{1}{2}''$ Strips, the last mentioned numbered 50. A $3\frac{1}{2}''$ Rod 51 journalled in the 1" Corner Brackets 52 carries a $\frac{1}{2}''$ Pinion 53, a 1" Pulley 54 and two Collars. A 3" Rod 55, mounted in the $1\frac{1}{2}''$ Strips 50, carries a $\frac{3}{4}''$ Sprocket Wheel 56, a $\frac{3}{4}''$ Contrate Wheel 57 and two

Collars. The Sprocket Wheel 56 drives a similar one on a 3″ Rod 59. An 11½″ Rod 60, mounted in the centre of the control cabin takes the drive from the ½″ × ¾″ Pinion 29 via the 57-toothed Gear Wheel 61. The movement of the Rod is controlled by a 4½″ Strip 62 operating similarly to the Strip 39. When the Strip is in its lowest position, the Worm Wheel 63 should engage with the Pinion 53, and when in the highest position the ½″ Pinion 64 should engage the ¾″ Contrate Wheel 57. Neutral is about the central position.

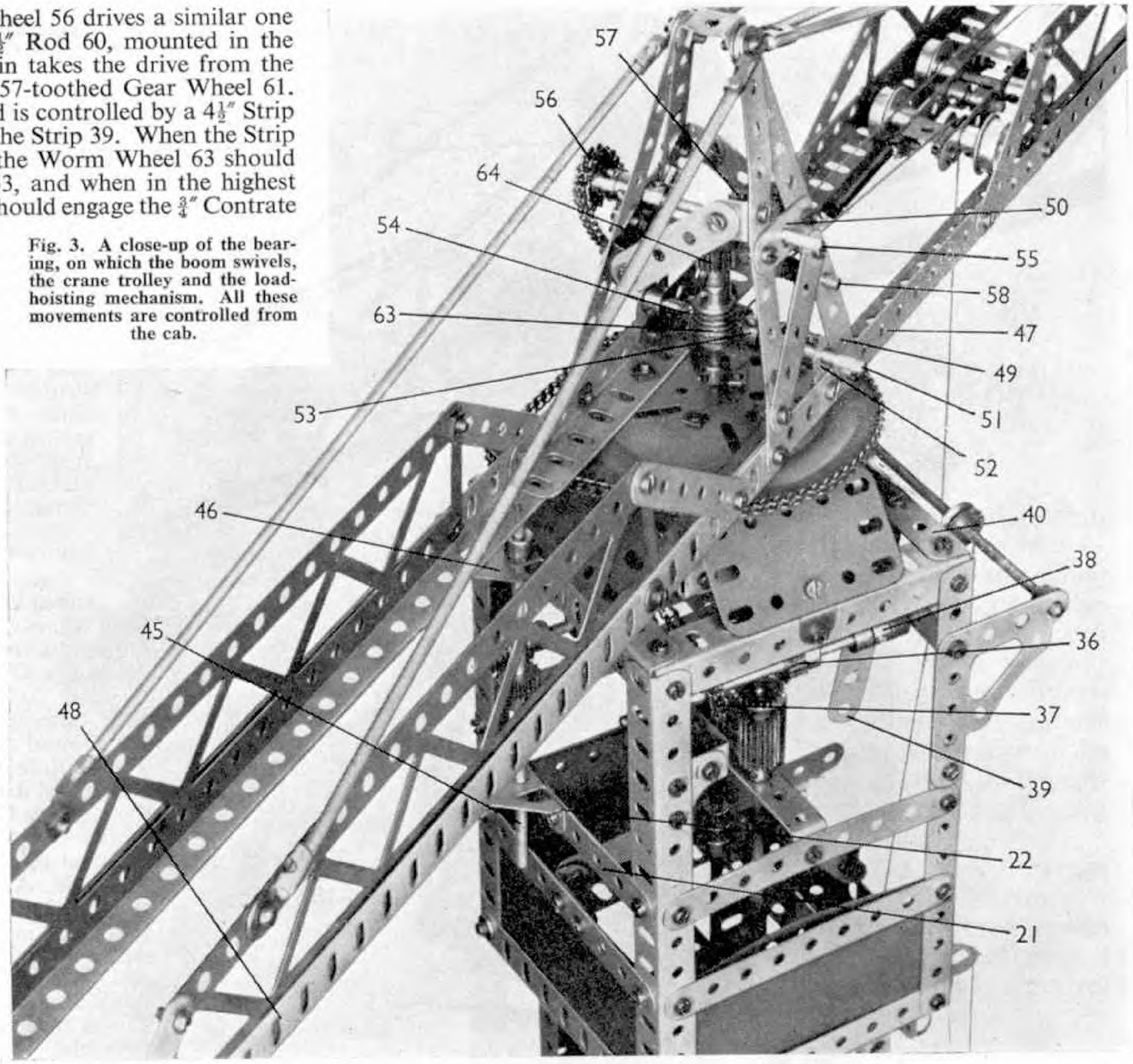


Fig. 3. A close-up of the bearing, on which the boom swivels, the crane trolley and the load-hoisting mechanism. All these movements are controlled from the cab.

The Travelling Carriage on the Boom

Two 3″ Strips are connected together by two Double Brackets. The ¾″ Flanged Wheels are secured to 2″ Rods, one Rod having a ½″ loose Pulley on it. A 1″ loose Pulley is placed on a 3½″ Rod 65 mounted at the front end of the boom. A length of Cord is tied to the Double Bracket at the front of the carriage, taken around the 1″ loose Pulley, around 1″ Pulley 54 and then fastened to a Spring attached to the carriage, with enough tension on the cord to avoid slip. Another length of Cord is wound around the Rod 58, taken over the ½″ Pulley in the carriage and fastened to a large Loaded Hook. A length of Chain is placed around the ¾″ Sprocket Wheel on Rod 45 and the Toothed Disc.

A counterbalance weight at the rear end of the boom is made up from five 4½″ × 2½″ Flat Plates bolted to two 2½″ × ½″ Double Angle Strips that are attached to the 4½″ × 2½″ Flat Plates 66.

Before setting the model in motion make sure that all the rods rotate freely in their bearings.

Parts required to build the Meccano Tower Crane: 2 of No. 1a; 25 of No. 2; 12 of No. 2a; 5 of No. 3; 8 of No. 4; 6 of No. 5; 2 of No. 6; 2 of No. 6a; 6 of No. 7; 2 of No. 7a; 2 of No. 8a; 4 of No. 8b; 11 of No. 9a; 3 of No. 9b; 6 of No. 9d; 2 of No. 9f; 3 of No. 11; 7 of No. 12; 4 of No. 12a; 5 of No. 12b; 7 of No. 13; 2 of No. 13a; 3 of No. 14; 3 of No. 15; 2 of No. 16; 4 of No. 16b; 2 of No. 17; 2 of No. 18a; 1 of No. 18b; 1 of No. 19h; 4 of No. 20b; 1 of No. 22; 1 of No. 22a; 2 of No. 23; 1 of No. 24; 1 of No. 25; 5 of No. 26; 1 of No. 26b; 1 of No. 27; 2 of No. 27a; 2 of No. 29; 2 of No. 32; 236 of No. 37a; 224 of No. 37b; 38 of No. 38; 1 of No. 43; 5 of No. 48a; 2 of No. 48c; 9 of No. 53a; 1 of No. 57b; 28 of No. 59; 1 of No. 62; 1 of No. 63; 2 of No. 81; 1 of No. 94; 1 of No. 95; 4 of No. 96a; 2 of No. 99; 2 of No. 99a; 1 of No. 103c; 4 of No. 103f; 2 of No. 103h; 2 of No. 108; 5 of No. 111c; 4 of No. 115; 1 of No. 120b; 2 of No. 126; 4 of No. 133a; 1 of No. 168; 6 of No. 188; 3 of No. 191; 2 of No. 211a; 12 of No. 212; 2 of No. 213; 1 E15R Electric Motor.

NEW ANNUAL FOR BUS FANS

Buses Annual 1964 (Ian Allan, 12/6) makes a fitting new companion—this is its first appearance—to the now familiar *Trains Annual* and *Aircraft Annual*. The bus in its various forms seems likely to play an increasing part in public transport in view of the thinning-out of railway services now imminent, so the present time is particularly apposite for the publication of this new annual. In it, widely-varied aspects of bus operation are considered, starting appropriately with a section entitled "Birth of a Bus", which explains the why and how of bus design, development and building. Successive sections deal with the problems involved in keeping the wheels turning, and explain how the maintenance and overhaul programmes are arranged.

Bus transport overseas, the mail bus services of North-West Scotland—an institution in themselves—and a special consideration of the London T-type single-deck vehicles all make interesting stories. Nor is the evolution of something we have all collected in our time—the bus ticket—overlooked, for interesting details are given of the various systems of bus ticket issuing and cancellation.

That nearest relative of the motor bus and the tram car—the trolley bus, of silent service—is rightly considered too in a section that covers the various trolley systems, now so few in number. Economic and other features have combined to restrict the life of the trolley system to little more than fifty years. The book concludes with interesting details of the development of the coach rally, a type of event that has come into being and attained increased popularity during the past decade.

There are plenty of illustrations in the 96 pages, and these show how the basic bus has been, or can be, developed into a surprising number of varieties. The book is sure to have a strong appeal for bus and coach enthusiasts.

An Attractive Roundabout

THE simple Roundabout illustrated here is an ideal subject for young model-builders, and can be constructed from a Meccano Outfit No. 3.

The chassis is built up from a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate 1 extended by two $12\frac{1}{2}''$ Strips which are connected by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 2. The bolts joining each Strip to each lug of the Angle Strip also help to hold two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plates 3 in position. A $3\frac{1}{2}''$ Crank Handle carrying a fixed 1" Pulley is journalled in the apex holes of Plates 3, as shown in the illustration.

The bolts connecting the $12\frac{1}{2}''$ Strips to Flanged Plate 1 also hold two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates 4, edged by $2\frac{1}{2}''$ Stepped Curved Strips 5 and connected by a further $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 6. A 4" Rod, journalled in this Double Angle Strip and the Plate 1, is held by a 1" Pulley at the bottom and a Spring Clip at the top. Above the 1" Pulley a 2" Pulley is fixed and this is connected to the 1" Pulley on the Crank Handle by a length of Cord.

The revolving structure is made up from an 8-hole Bush Wheel 7 to which four $5\frac{1}{2}''$ Strips are bolted, two diametrically opposite bolts also holding Angle Brackets 8 in place. Two horses are built from a "U" Section Curved Plate, a Flat Trunnion, two Fishplates, an Angle Bracket and a Double Bracket. The Double Bracket is held by Bolts 9.

SPANNER'S SPECIAL SECTION FOR JUNIORS



This neat little Roundabout can be constructed from Meccano Outfit No. 3.

In one of the horses a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Red Plastic Plate is used instead of the "U" Section Plate. Each horse is fixed, as shown, to one of the $5\frac{1}{2}''$ Strips by a bolt which passes through the Double Bracket and the end hole of the Strip.

Each of the two revolving chairs is built up from two Semi-Circular Plates to which a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Red Plastic Plate are fixed by three Angle Brackets to form the back, which is braced by two Formed Slotted Strips 10. $\frac{3}{8}''$ Bolts are passed through the Semi-Circular Plates, through 1" Pulleys and are finally lock-nutted through the end hole of the other $5\frac{1}{2}''$ Strips, care being taken to see that each chair turns freely. The Bush Wheel 7 is fixed on the 4" Rod.

A further two $5\frac{1}{2}''$ Strips are bolted to the other lugs of Angle Brackets 8, and they are joined at the top by a $\frac{3}{8}''$ Bolt that also holds two Trunnions 11 in place. The arms are braced by lengths of Cord, as can be seen.

Parts required to build the Meccano Roundabout: 2 of No. 1; 6 of No. 2; 8 of No. 5; 4 of No. 10; 2 of No. 11; 10 of No. 12; 1 of No. 15b; 1 of No. 19g; 1 of No. 20a; 2 of No. 22; 2 of No. 22a; 1 of No. 24; 3 of No. 35; 60 of No. 37a; 55 of No. 37b; 10 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 4 of No. 90a; 3 of No. 111c; 2 of No. 126; 2 of No. 126a; 2 of No. 188; 2 of No. 190; 2 of No. 194; 1 of No. 194a; 1 of No. 199; 2 of No. 214; 4 of No. 215; 4 of No. 221.

Roundabouts of one type or another are still the mainstay of small fairgrounds, but the big modern amusement parks familiar at seaside resorts and elsewhere include many other items of which fairly simple Meccano models can be constructed.

WINTER MODEL-BUILDING CONTEST No. 1

Cash Prizes For Meccano Models

THIS month we announce details of the first of our series of Winter Model-Building Competitions, and as in previous years the contest is open to every owner of a Meccano Outfit, whether he or she lives in this country or overseas. In these contests we are offering cash prizes for the most original and best-built Meccano models of any kind. Models need not be confined to the parts contained in a given Outfit. Any amount of extra parts may be used as required. The prizes to be awarded are set out in the panel on this page.

HOW TO ENTER

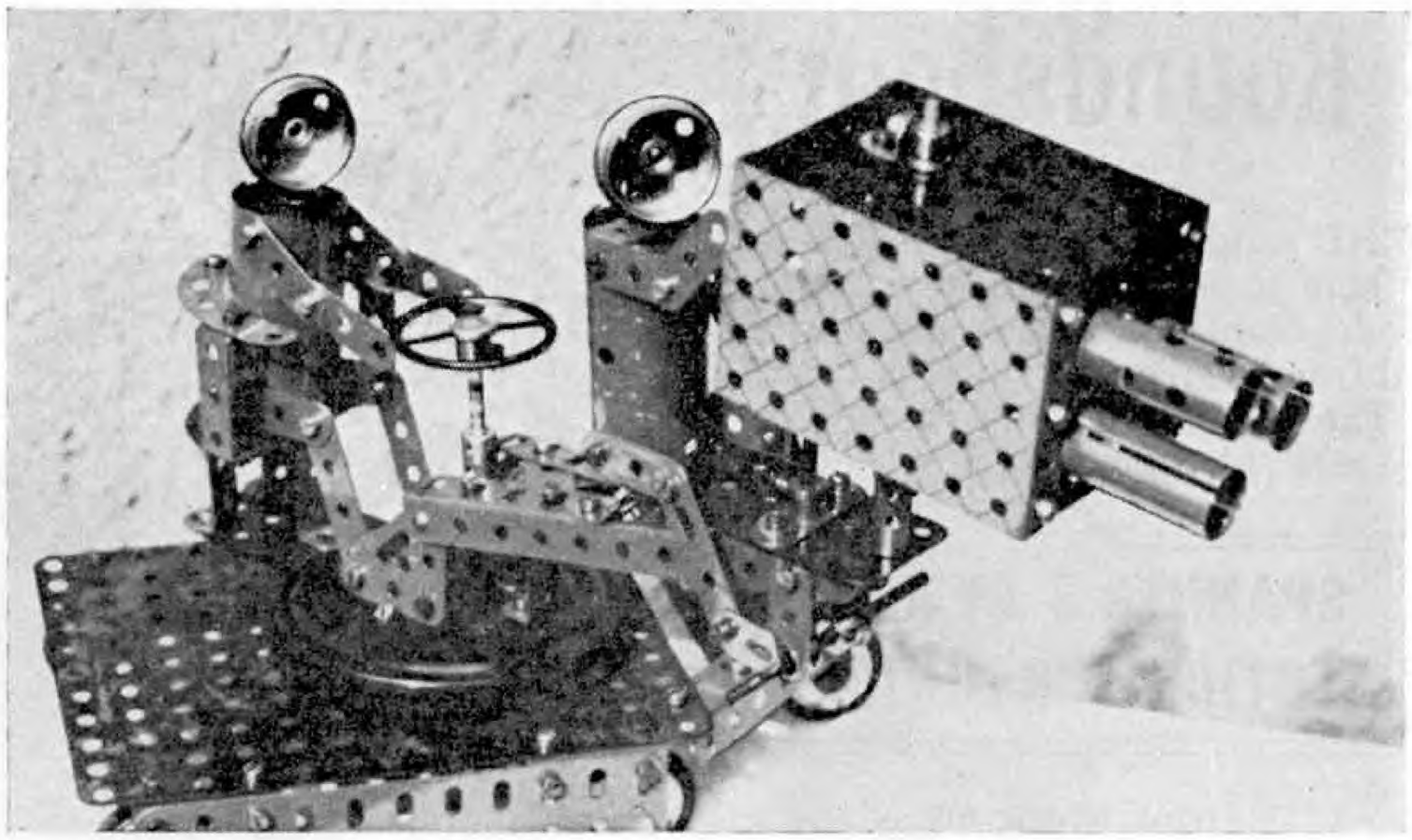
If you wish to enter this competition all you have to do is to think of a new model and then set to work to construct it as neatly and realistically as possible, from standard Meccano parts. Models that are merely copies of models shown in Meccano Instruction Books or other Meccano publications will not, of course, be eligible.

When you have completed your model, the next thing is to obtain either a good clear photograph or, if this is not possible, make a good sketch of it, and send this to us. *The actual model must not be sent in any circumstances.* However, if you are unable to obtain a photograph of it and you are not much good at sketching, it is quite permissible for you to get a friend to prepare a sketch for you. The model itself, however, must be your own unaided work.

It is also advisable to enclose with the photographs or drawings a short description of the main features of your model, mentioning any points of special interest that should be brought to the attention of the judges.

EQUAL CHANCE FOR ALL

The competition is open to model-builders of all ages living in any part of the world, and in order that everyone has a fair chance entries will be divided into two separate Sections as follows: Section A, for competitors who will be under 14 years of age on January 31, 1964; Section B, for competitors aged 14 or over on that date. In each of these Sections a separate set of prizes will be awarded in accordance with the details given in the panel on this page.



This comparatively simple model of a mobile Television Camera and crew won a prize for Peter Goldsmith, Hornchurch, in a competition some time ago. Peter was only 12 years of age when he built the model.

The judges will award the prizes for models that are most original in subject, and are well-proportioned and sturdily constructed. Competitors who possess only a small Outfit need not feel that they will not stand much chance against competitors with large Outfits at their disposal. A small, well-built, sturdy and original model will have a far better chance of success than a large and complicated structure that is rickety in construction and poor in design, and which does not show much originality in its subject.

The following notes may be helpful to competitors, especially those who have not entered a *Meccano Magazine* model-building competition before:

You may choose any subject you like for your model, but be careful to select one that you can reproduce realistically with the Outfit you possess. For instance, if you have only a small Outfit it would be difficult to make a really good model of a large type of crane. If, on the other hand, you were to choose a simple truck or windmill as your subject, the probability is that you would be able to make a really good job of it. Another good point to bear in mind is that it will help you on the way to success if you choose a model that "works".

HOW TO POST YOUR ENTRY

Before posting your entry make sure that you have written your age, name and address, and the letter A or B, indicating the Section in which you are entering, in block letters on the back of each photograph or drawing. Then address your envelope to: *Winter Model-Building Competition No. 1 Meccano Limited, Binns Road, Liverpool 13.*

CLOSING DATE

Intending competitors should note that this competition will remain open for entries until January 31, 1964. Entries may be sent in at any time between now and the closing date, but any entries received after that date will be disqualified.

Prize-winning entries are not returnable, but unsuccessful entries will be returned if a stamped addressed envelope of suitable size is enclosed with the drawings or photographs.

Winter Model-Building Competition

THE PRIZES

The following prizes will be awarded in each Section of the Competition:

SECTION A

(Competitors under 14 years of age on January 31 1964)

First Prize	**Cheque for £5.5.0**
Second Prize	**Cheque for £3.3.0**
Third Prize	**Cheque for £2.2.0**

Ten prizes each of 10/6d.

Certificates of Merit also will be awarded in this Section to those competitors whose entries just fail to reach prize-winning standard.

SECTION B

(Competitors aged 14 or over on January 31 1964)

First Prize	**Cheque for £7.7.0**
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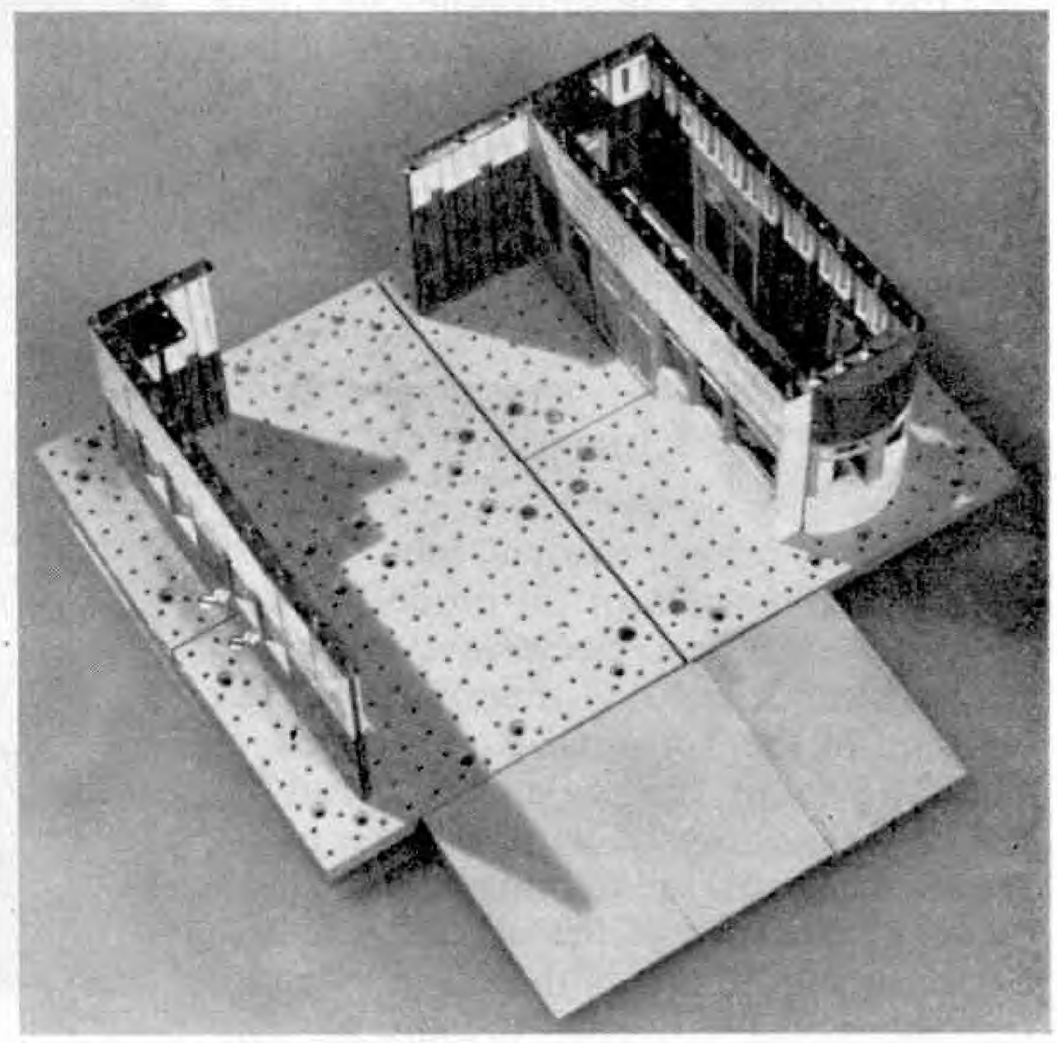
THE BAYKO BUILDER

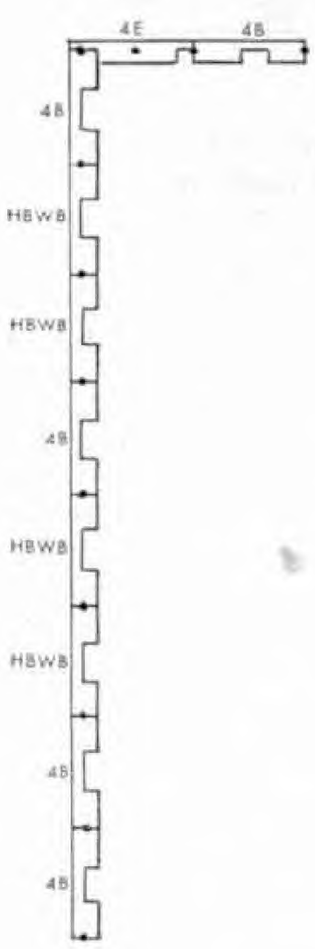
A Model Bus Station

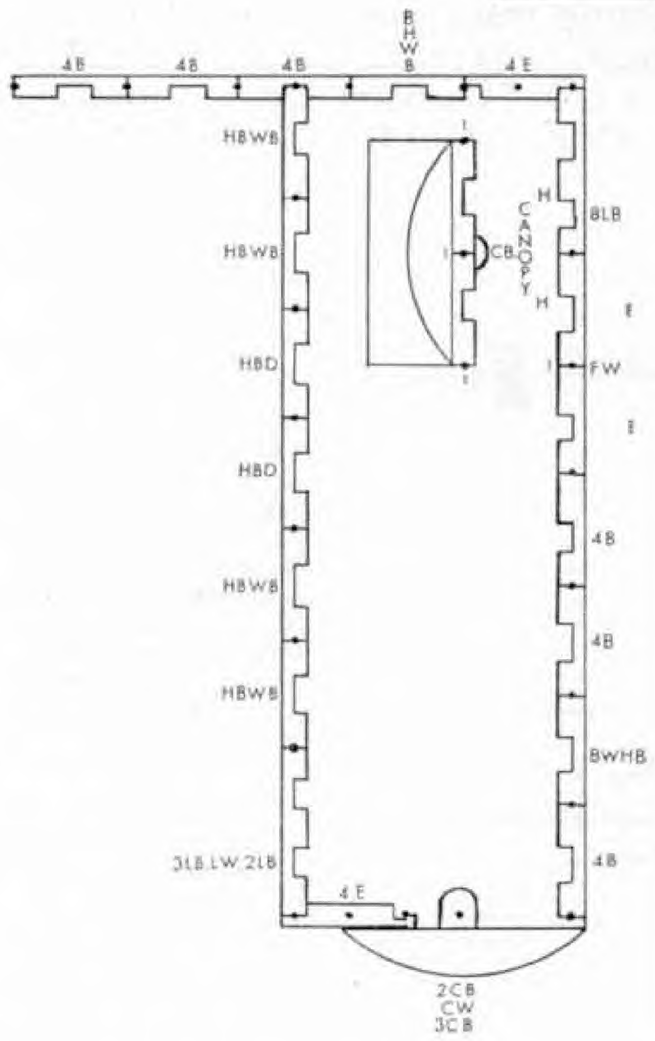


THE Toyman, in his "Dinky Toys News", has often stressed the fact that Bayko and Dinkies combine excellently when used in conjunction with each other. The model Bus Station, illustrated on this page, provides undeniable proof of this for it will accommodate up to four Dinky Toys buses, at any one time, in the parking area. In addition, there is a fine waiting room equipped with a highly realistic seat.

The original model was designed and built by Miss Christine leConte of Grange, on the Wirral Peninsula, who is only nine years of age. This in itself prompts me to offer special congratulations, as it is not often that such a well-proportioned and sturdily-constructed model is produced by so young a builder. Christine is the proud owner of a Number 15 Outfit, but you will see that she has not been too ambitious by attempting to use all the parts in the Outfit at once. I am told, in fact, that she built this "small" model mainly to gain an understanding of the constructional method of Bayko. Having studied the completed building, I should not be surprised if her parents now find they have a budding architect on their hands!







Dinky Toys Atlantean buses (No. 292) are seen drawn up in the Bayko bus station in the top picture. Centre: A view of the partly-completed model showing the method of construction. Bottom: The building plan.

Turning now to the Bus Station itself, No. 4 Brick Rods are used throughout its construction except in the few places marked on the plan

(*Continued on page 488*)

PARTS REQUIRED TO BUILD THE BUS STATION

4 Bases; 6 Base Links with Screws; 33 Red Bricks; 33 White Bricks; 4 Red Curved Bricks; 2 White Curved Bricks; 5 Red End Bricks; 7 White End Bricks; 2 Red Half Bricks; 14 White Half Bricks; 6 Red Long Bricks; 7 White Long Bricks; 4 No. 1 Brick Rods; 36 No. 4 Brick Rods; 1 Canopy; 2 Doors; 10 Glazing Materials (Window); 1 Glazing Material (Curved Window); 1 Glazing Material (Large Window); 3 Ramps; 2 Pantile Roofs, type D; 2 Corner Ties; 17 Straight Tie Bars; 10 Windows; 1 Curved Window; 1 Large Window; 1 French Window.

FROM THE TRAIN SET ONWARDS

CAB CONTROL

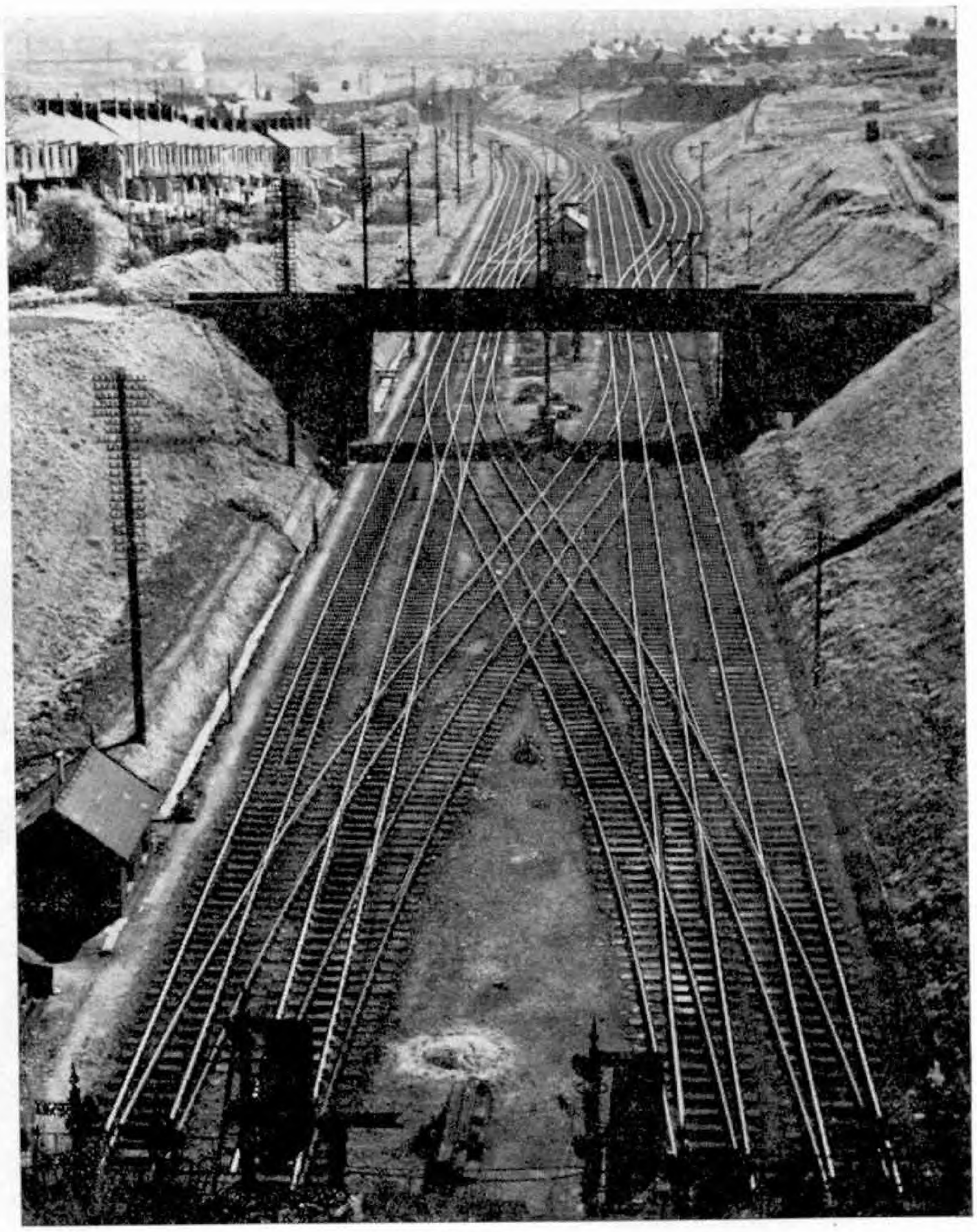
THOSE of you who belong to a model railway club or, alternatively, read one of the several model railway journals, must have occasionally noted references to a control system known as Cab Control. For the benefit of those people who have not fully understood the workings of this system I intend, in this article, to explain (with diagrams) how this system can be applied to model railways using Hornby-Dublo Simplec Points.

Before we venture into the intricacies of this system of control I think it would

By Linesman

be as well to refresh readers' memories on the basic essentials of all model railway wiring. The first necessary principle, which should be fully understood, is the position of the Terminal Rail, or feed, as it is known in the scale model railway world. This must, without exception, always be positioned at the toe end of a point, irrespective of the wiring system to be employed, and it is therefore essential that the meaning of the "toe end of a point" is understood. This is always the end on which the switching device is located, and is usually the single track portion of all points.

Although failure to position the feed at the toe end of the point does not necessarily result in a short circuit, it is as well to standardise when positioning your feed to avoid the possibility of making a mistake. While it is true that Simplec Points are immune from the usual causes of short circuits generally attributed to the old type of points, Cab Control requires that they be treated similarly for the simple reason that the principle of this system of control demands that no two sections should be interconnected. For the benefit of those among you who may be puzzled by the word "section" this refers to an area of track which is fed by one Terminal Rail, or feed. This area of track is termed "section" because the electricity supply may be interrupted by a switch on the control panel.



This complicated track arrangement at Gaer Junction, Newport, is the subject of this month's prototype track formation. Photograph by J. G. Hubback.

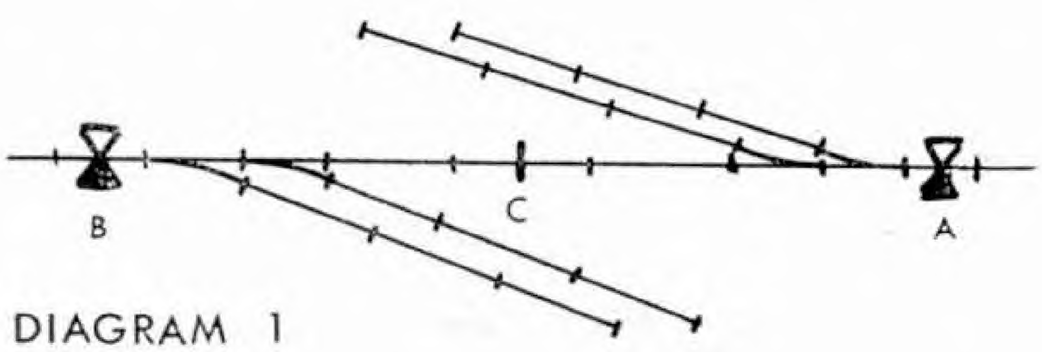


DIAGRAM 1

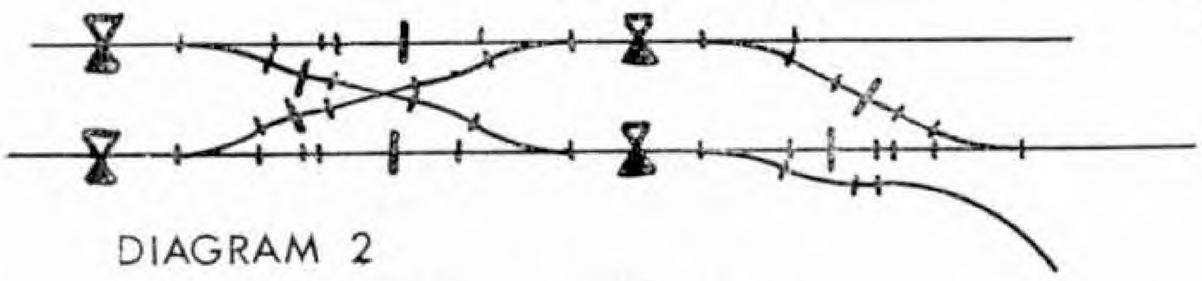


DIAGRAM 2

These two diagrams show the typical positions of feeds, or terminal rails. Readers will notice that the Diagram No. 2 is a miniature version of the photograph at the top of the page.

Example of Feeds

An example of feed positioning is given in Diagram 1 and if you study this drawing it should clarify the matter in your mind. The diagram shows two sets of sidings,

arranged in such a manner that the points of each set of sidings are facing the opposite set of points. As you will see, the feeds (or Terminal Rails) are positioned on the extreme edges of the drawing; at the toe end of each set of points. Due to the fact that Cab Control demands that no two sections be interconnected, a Double Isolating Rail is placed midway between the sets of sidings. The Double Isolating Rail therefore interrupts the flow of current between feed A and B, making it possible to operate two trains simultaneously; one in the set of sidings controlled from section A, and one in the set of sidings controlled from section B. Alternatively, either may be switched off to allow a locomotive to remain stationary. The Double Isolating Rail is placed in position C. These independent sections are known as "Cabs", which is why this form of control has come to be known as "Cab" Control.

A Basis for Working

The above notes form a complete basis upon which Cab Control works, and provided the reader remembers these notes, he should not encounter any great difficulty in wiring his layout for Cab Control. Although I have recommended a Double Isolating Rail, or double gap, a Single Isolating Rail may be used provided you remember to place the gap of the Single Isolating Rail on the same side as all other Single Isolating gaps on the layout. If this is not done, interconnection between sections will result.

The fact that there is only one gap separating the sections can result in a smaller amount of wiring, because the rail with no gap does, in fact, form an unbroken grid throughout the layout, which acts as a common return, between all sections and the power pack. Only one wire need therefore be taken from the common return side of the track to the power units, thus saving a great quantity of wire, if the layout concerned is a large one. I would, however, recommend readers who are not familiar with this method of control to adhere to the Double Isolating Rail, with its attendant two wires, until such time as they have become proficient at wiring.

Point to Remember

One of the difficulties with the Cab Control system of wiring is the necessity for double-wound transformers, if a secondary controller is to be used. This is because both return wires from the controller will be connected to each other; thus causing interaction if only a single-wound transformer is used.

If we now study diagram 3 regular readers will notice that the layout plan shown is exactly the same as that published in the August issue of the *Meccano Magazine*. The purpose in publishing this plan twice is to provide readers who have built the layout with an opportunity to wire it for the Cab Control method of wiring. You will notice that the layout is wired for two controllers, this is because Cab Control is not really effective unless an operator has the choice of control over two locomotives in any position on the layout on either of the controllers. It is, for example, possible to operate a locomotive on the goods yard sidings, shunting wagons, and simultaneously to bring a train from the storage sidings into the station platform. The locomotive may then be run over the crossover, and round the run-round loop, simply by switching off the appropriate section. The electrical switches on the layout are simple on–off switches, or S.P.S.T. switches, which are obtainable from electrical shops or the larger multiple stores. Ordinary house light switches are an example of an S.P.S.T. switch, although toggle switches, which are obtainable from government surplus stores, are preferable to the ordinary house type switch.

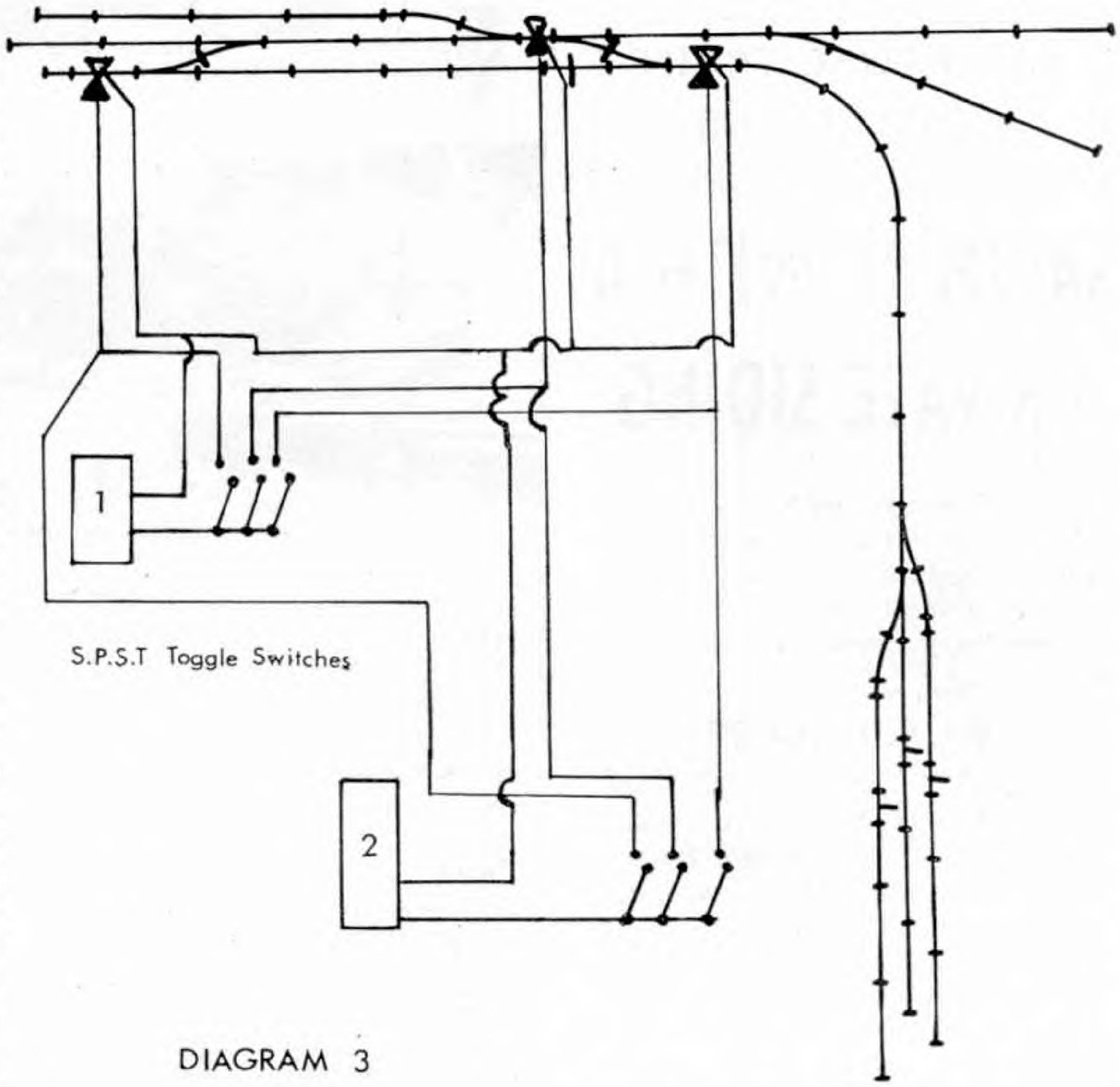


DIAGRAM 3

A Modified Plan

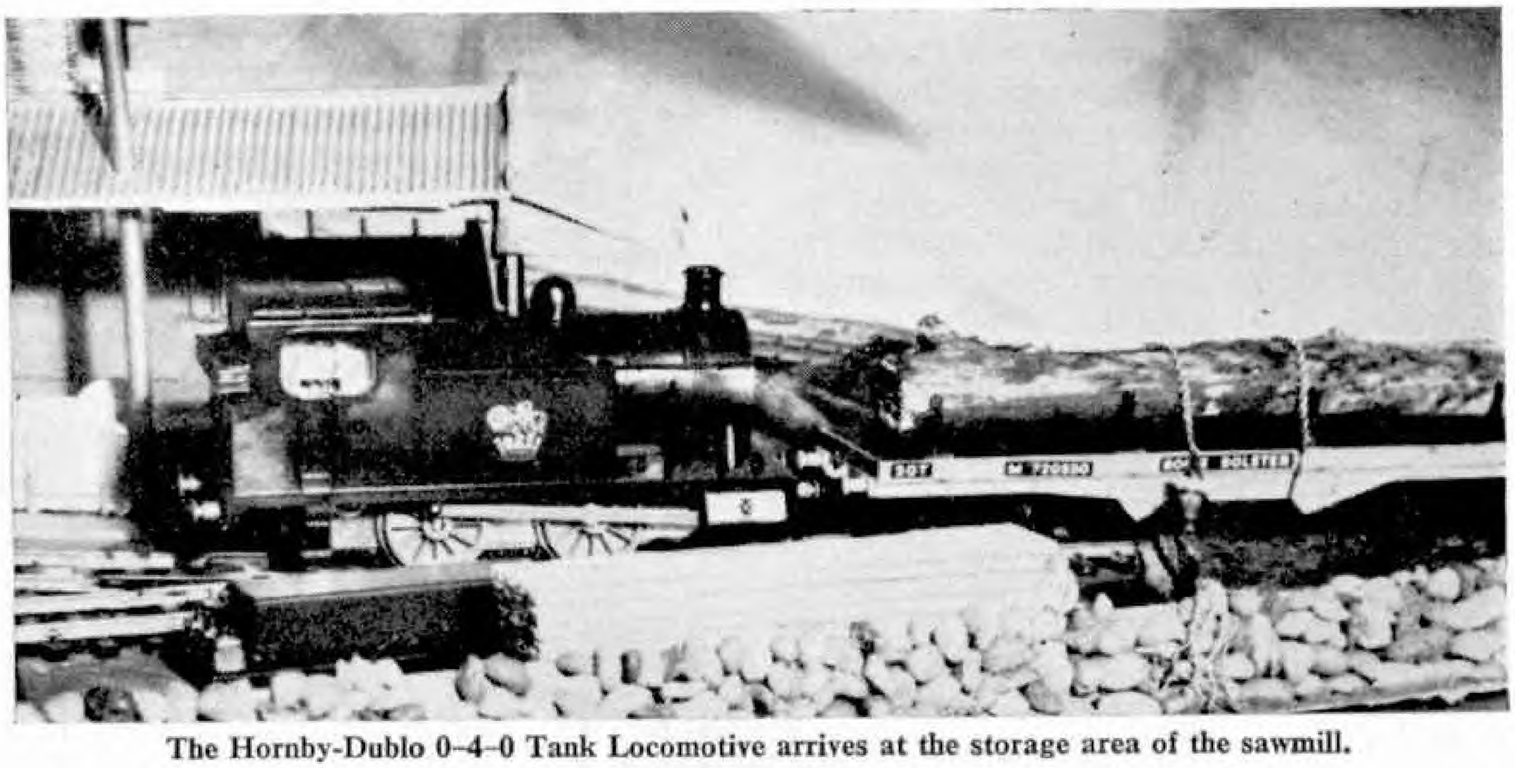
The photograph shows a most complicated track arrangement which could once be seen at Gaer Junction, Newport. This is the subject of this month's prototypical track plan. Last month's article, you will remember, showed the modifications of two British Railways plans to suit Hornby-Dublo track components. I have therefore shown a similar plan of Gaer Junction, heavily modified as in Diagram 2. Readers will notice that the track arrangement includes two up main lines and two down main lines with a double track scissors crossover and with a double track junction at the right-hand corner of the picture. As it is very unlikely that the average modeller will have built a layout having a quadrupled main line I have decided to condense the track arrangement into one up and one down main line. Because of this I have found it necessary to reduce the crossover to just an ordinary scissors, with a single track junction and crossover at one end.

Meaning of Symbols

The plan is sectionalised for Cab Control and shows the appropriate feeds and isolating rails. Anyone wishing to build this formation has only to employ a similar switching arrangement to that shown in Diagram 3. Readers will notice that the symbols denoting the various features have changed since previous articles. This is simply to facilitate recognition of the various wiring points for the reader uncertain as to which is the feed and which is the return. As you will probably have gathered the blackened portion of the X refers to the return and the unshaded portion to the feed; a line extending completely over the rail denotes a Double Isolating Rail and the line extending over one portion only represents a Single Isolating Rail. A list of parts for any of the diagrams in this article will be supplied on request. You should enclose a stamped addressed envelope.

MINIATURE TRAIN FORMATIONS

SAWMILL WITH A PRIVATE SIDING



The Hornby-Dublo 0–4–0 Tank Locomotive arrives at the storage area of the sawmill.

A SAWMILL with its timber storage in the open and in open storage sheds is a popular lineside feature of many 00 gauge railway layouts, and so this month we will

By S. F. PAGE

see just how simple it is to operate two railways independently, by providing a sawmill with its own lines.

Whatever the size of your Hornby-Dublo Two-Rail layout, the sawmill sidings may be introduced to employ the 0–4–0 Tank Locomotive, which is the motive power of the 2001 Train Set, together with the Open Wagons, Brake Van and the control unit which will be employed to operate this private line as distinct from the controller for your main layout.

The sidings form an end-to-end layout, with the sawmill at one end and the docks at the other, a connecting line being laid to your main track.

One such private siding figures on my Longdon, Newborough and Easthyde Railway (L.N.E.R.). Some rolling stock is owned by the mill, and for this reason never leaves the private line. This consists of three Hornby-Dublo 30-ton Bogie Bolster Wagons (No. 4610), two Open Wagons and a Brake Van.

The Bogie Bolster Wagons are employed exclusively in bringing up the logs from the docks, and the Open Wagons are used to accept the sawdust, and are emptied periodically at a point distant from the mill.

The Bogie Bolster train is of the push-pull type—that is, the engine pushes empty wagons to the docks, and pulls full ones up to the outside storage yard.

Railway company stock shunted into the mill sidings includes a number of Double Bolster Wagons (No. 4615) for the transport of finished timber and No. 4325 Vans and 4670 Open Wagons for the dispatch of bundled sawn timber, quantities of made-up parts such as doors and window frames, and pit props.

Now let us see how this private line is operated. At the start of a day's work the 0–4–0 Tank Locomotive proceeds into the tunnel, where the Bogie Bolsters and Brake Vans are hidden—suggesting a trip to the distant docks—and returns hauling the loaded wagons up to the stock yard.

Meanwhile, empty Bolster Wagons are standing in the loading bay—ready to accept the finished timber—as well as vans and wagons where applicable. Two Open Wagons stand beneath the sawdust extractor plant ready to accept the waste.

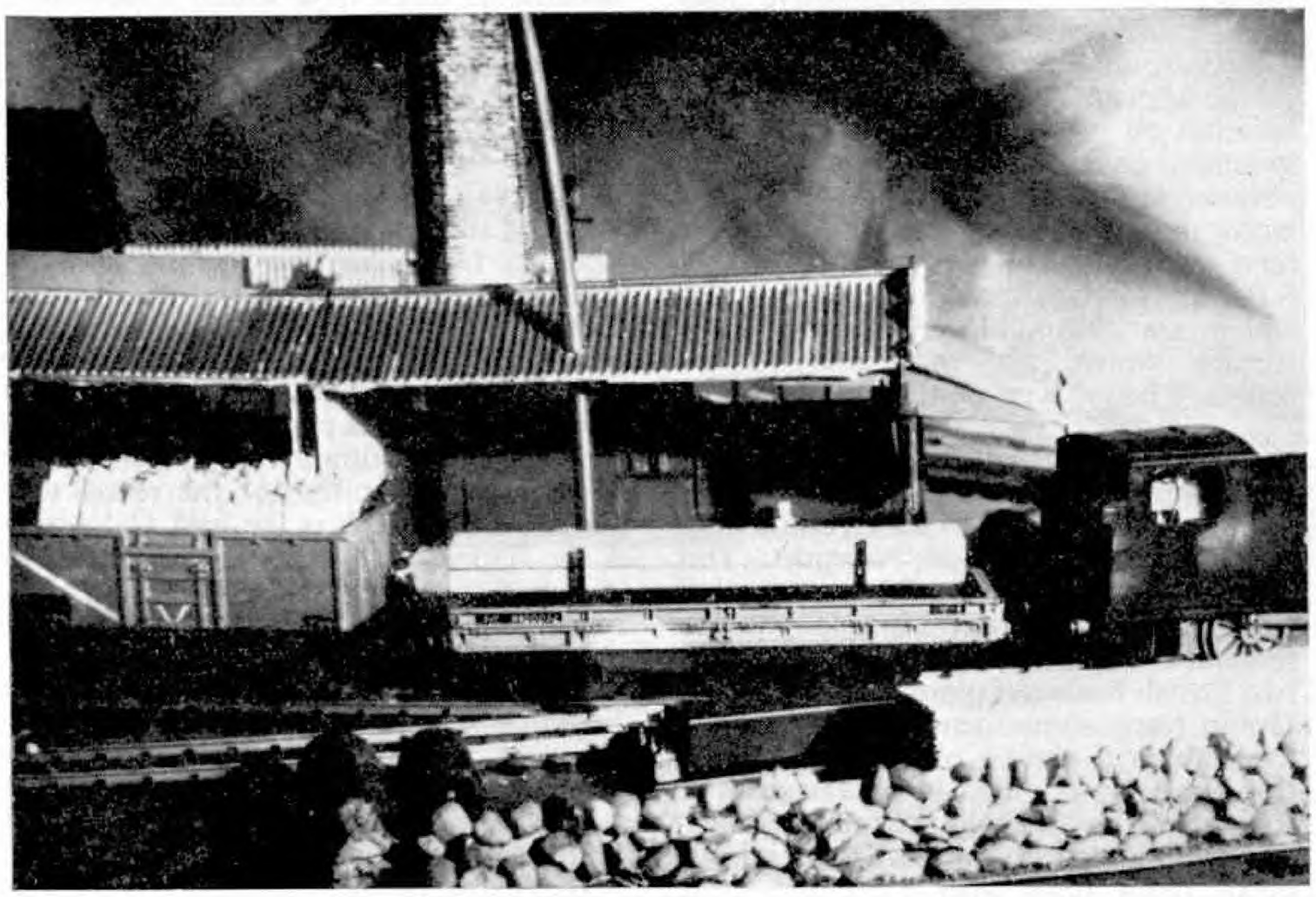
Once the Bogie Bolsters have been off-loaded they are pushed back to the docks—that is into the tunnel and out of sight. The engine is uncoupled by the use of No. 2746 Electrically-Operated Uncoupling Rail, and returns to the loading bay. Here, it pulls out any loaded Bolster Wagons and shunts them into the empty wagon siding to await collection by a scheduled freight train.

Meanwhile, the first of the Open Wagons has been filled with sawdust and so the locomotive pushes the next empty wagon into position under the extractor plant.

By now, a freight train has picked up the loaded Bolster Wagons from the empty wagon siding and has left a number of empty wagons in their place. These "empties" will now need to be shunted into the loading bay, and by this time the Bogie Bolster Wagons are loaded at the docks and are awaiting collection.

Such, then, is the start of model working of a sawmill private (*Cont. on page 489*)

A loaded Double Bolster Wagon, together with a load of pit props in an open wagon—a Hornby-Dublo Mineral Wagon in this case—being drawn out of the branch sidings.



WITH THE SECRETARY

Club and Branch News

MECCANO CLUBS RECENTLY AFFILIATED

43RD MANCHESTER BOYS' BRIGADE M.C.—*Leader:* Mr. G. A. Harris, 16 Manchester Street, Manchester 2.

GOVERNMENT CRAFT SCHOOL M.C.—*Principal:* Mr. E. A. Johnson, Government Craft School, Wudil, Kano, Nigeria.

CLUB NOTES

MAYLANDS M.C.—The club was asked by Willis Street Methodist Church, Mosman Park, about twelve miles away, to put on an exhibition to help raise funds for the church. The club agreed to help, an excellent display of working models was arranged, and groups of members went along to the church hall to operate the models.

The models displayed included Trevor Carpenter's 7 ft. high model of the Eiffel Tower, bedecked with seven dozen lights; Trevor Criddle's double flyboats, with intermittent gear and coloured lights; Reg England's streamlined locomotive and tender; a stiff leg derrick built by Chris Ridley; a horizontal steam engine by Ron Maidment, and a hammerhead crane built by Michael Thair. Other good models were John Gaunt's traction engine, and a truck constructed by Nicky Fermanis. The exhibition was a great success and aroused a lot of interest. It also gave some members their first practical experience of working an exhibition.

An end-of-term club party marked the beginning of the school holidays. Other recent activities have included a visit to Parliament House, where Mr. Robinson, M.L.C., the Legislative Council Member for our district, acted as host. A very good insight was gained into the procedure in both Houses of Parliament, and the boys greatly enjoyed the privilege of sitting in the chairs usually occupied by the Council members! During the visit they were treated to a snack of sandwiches and pies, with soft drink to wash it all down.

It is intended to revive the table tennis tournaments after the school holidays, with advanced and beginners' groups competing for honours in their respective sections. Later on the club intend to join the West Australian Table Tennis Association and enter teams in the association's annual tournaments. *Secretary:* Mr. Trevor Criddle, 17 Kenilworth Street, Maylands, Western Australia.

NEW ZEALAND

CHRISTCHURCH M.C.—Subjects of recent model-building meetings have been *Space Vehicles*, which resulted in some well-built models—and some queer ones!; *Found in a Kitchen*, for which quite a variety of useful kitchen items were modelled effectively; and *Games models*, when again there was a good variety of models completed, and afterwards games were played with the models. At one meeting different types of steering mechanisms were described, and on another occasion T. Hardwick gave a very interesting talk on *The Motor Engine and how it works*. *Secretary:* Mr. Peter Satterthwaite, 7 Huia Street, Riccarton, Christchurch 4, New Zealand.



The enjoyment of Meccano model-building is typified in this excellent picture of a member of the Wellington Secondary Modern School (Bury) M.C. getting on with the job and obviously pleased with his progress. Illustration by courtesy of Tillotsons Newspapers Ltd., Bolton.

A group of enthusiastic members of the Undenominational School (Worcester) M.C., with some of the Meccano models that they have built. This club was affiliated to the Meccano Guild in April this year.



BRANCH NEWS

ST. ANNES Y.M.C.A.—A model railway exhibition arranged by the 9–12 years old members attracted 2,000 visitors during the school summer holidays. Admission was free, but a box for donations, hung near the entrance, resulted in a profit of £25. During the autumn, winter and next spring the Branch layout is being made available to Y.M.C.A. members, who will be able to operate it for their own enjoyment. In this way it is hoped to introduce many of these members to the Hornby Railway Company. During these months the Branch members hope to carry out a round of visits to places of railway interest such as stations, signal boxes, locomotive sheds and museums. *Secretary:* Mr. Brian Pickett, 26 Walter Avenue, St. Annes, Lancs.

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For Stamp Enthusiasts

Omnibuses

By F. E. Metcalfe

PEOPLE who do not have anything to do with modern postage stamps will not know what the term "omnibus" has to do with these intriguing bits of paper, but stamp collectors know well enough, as the term is very much in vogue at the moment. Still, as many non-collectors seem to read these notes, I will begin by explaining that an "omnibus" issue is one in which a number of countries join together to emit a set of postage stamps, each in commemoration of some particular event. That is the theory, but hard-boiled collectors will say, not without some experience to back up their view, that omnibus issues are little more than tangible evidence of a number of countries making a concerted attack on philatelists' pockets.

Actually, I do not think the term is very descriptive, but it is, as I have said, much



in use at the moment among collectors, as quite recently there were two such issues, in which most countries took part —even our own colonies, which are not given to the emission of special stamps— a fact which has much to do with their popularity. While the object behind both these special issues is a good one, I am afraid it is also a fact that certain postal administrations will do a good deal better out of their stamps than will the objects these were supposed to benefit. Still, the majority of countries taking part will, no doubt, play the game, and as the "Red Cross", and the "Freedom from Hunger" campaign were the respective themes few collectors will object. Some will grumble and ask, "Why should we always be the ones to pay?" Others, more logical, will reply that no one asks us to buy the stamps, and when we do it is certainly not a case of throwing our money away, as the stamps we buy (if purchased at the right time, i.e. when they first appear) can actually show us a profit. So take your pick. But there is no doubt as to where the logic lies, and the thousands of collectors who do respond to the call are quite often doing themselves a good turn as well as the charity or fund concerned.

The first of the big "omnibuses" of 1963, the "Freedom from Hunger" issues, did provide a substantial sum for that very worthy object, and some of the stamps are already worth a bit more than collectors paid for them while they were current. As for our own G.B. set, which all collectors could buy at face, this can only be bought today at a small premium, particularly those stamps with the phos-



phor lines that were sold in London, S.E., and in the one or two provincial cities where those electronic sorting machines operate. (Readers will remember that a few months ago I wrote about those "Alf" machines, in which connection the phosphor-lined stamps are used.) I don't say that sets will yield much profit yet, but at least nobody is going to lose any money on them. In any event, the stamps can always be used for postage, but my advice is, hang on to them; they will pay for their keep all right.

The more recent omnibus issue was to mark the Red Cross Centenary, and the same remarks apply here. We could all buy at face, and here in Britain there were again ordinary and phosphor-lined sets. Incidentally, if the latter set was not on sale in your district for a reasonable period it may be obtained through the post from the Philatelic Bureau, G.P.O., London.

In the Red Cross itself we do indeed have something of world-wide importance to commemorate, either by stamps or any other suitable medium, and I think a few words about this great institution will not be out of place. They may provide a few facts which collectors can use in writing-up the stamps in their albums. It all started in the middle of the last century (in 1859, to be exact) while Austria was at war with both France and Italy. Solferino



battle in Northern Italy was a fierce affair, with more than 40,000 dead and wounded. One man who saw all this, Jean Henri Dunant, noted how the wounded were neglected, and decided to do something about it. Suffice it to say the Red Cross Society was formed, and to commemorate the centenary of this formation the huge Red Cross centenary omnibus issues appeared around September.

There have, of course, been many other such emissions. In the Commonwealth we have had them to commemorate the Silver Jubilee of King George V, the 75th Anniversary of the Universal Postal Union, Victory in World War II, the coronations of King George VI and Queen Elizabeth II, etc. Such issues make quite a stir when they are released, but with nothing new to sustain interest in them they are succeeded by other issues which steal the interest.

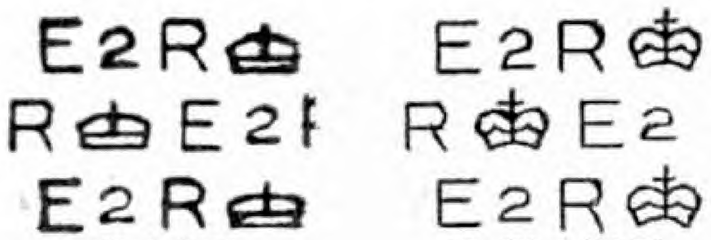
But there are a few which are in a rather different category, in one important respect. There are those issues, for instance, which are repeated year after year, and these repeats maintain some interest in previous releases. One such is the annual "Europa" omnibus. That title covers a mouthful—the European Conference of Postal and Telecommunications Administrations. Each year most of the member countries issue a set of stamps to mark the annual conference, and some of the stamps issued only a year or two ago are quite valuable today. An example is the Irish set of 1960 the face value of which was only 1/9. It would take a number of one and nines to buy a set today.

Stamp Gossip

Vintage Carriages

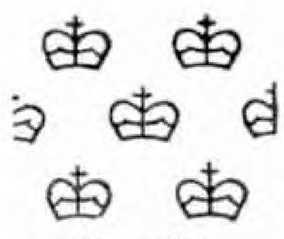
THERE is a tremendous vogue for vintage cars, but my taste runs more to vintage carriages, and thus one of my own small and pet collections consists of stamps depicting these old-time carriages. Believe me, there are quite a number of stamps, mostly inexpensive, to search for as an examination of, say, Gibbons Simplified Catalogue will show. One of these stamps, illustrated on this page, is a particular favourite of mine, as are several other stamps of Spain, for that country has for some time been issuing some beautifully designed and printed stamps. The stamp in question was issued in May to mark the centenary of the Paris Postal Conference. We also issued a 6d. stamp to commemorate the same event, but if you compare our effort with that of Spain you will see, perhaps, why we have to go in for watermarks to provide our fun. These "coach" stamps form a nice little thematic collection, one that I can recommend first-hand.





"Tudor" (T)

"St. Edwards" (E)



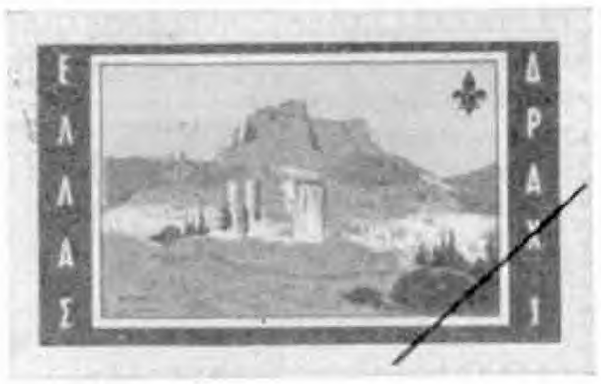
Crown (C)

WATERMARKS

Some time ago I mentioned the two watermarks in current use for British Colonial stamps. The Crown Agents recently announced that even for current stamps the last block letters watermark will now replace the script letters type. Our own British stamps of the present reign are now tremendously popular, and a good deal of this popularity has a connection with watermarks, for collectors like varieties, and as we have had three different watermarks since 1952 the resulting variations have meant some quite scarce stamps and, therefore, an increased interest in finding them. As some of these British "QE" stamps are really worth searching for, I am illustrating the different watermarks to show the differences. These illustrations are from the Commonwealth QEII Catalogue, and, as is explained in that work, the original watermark is known as Tudor from the shape of the Crown, etc. Anyhow, the three watermarks used during the present reign on our own stamps are here for examination.

THE ELEVENTH JAMBOREE

I think I have mentioned before how amusing it is that one or two countries, although they are really keen about the Boy Scout movement, go to quite a bit



of trouble to hide the fact that it was Lord Baden Powell who was the founder, and that the movement did not spring from their own efforts. You would certainly never know it if you examined any of their postage stamps issued to mark some scout event or other.

Well, Greece is certainly not afraid of giving credit where it is due. The eleventh World Jamboree was held at Marathon (what an appropriate venue!) and to commemorate the event the host country issued one of the wonderful sets of stamps we have learned to expect from Greece. The 3 drachmae stamp features the original Scout leader. There are five stamps in the set, but there is only room to illustrate one here, and this shows the Acropolis as dawn breaks. A wonderful stamp, and one which has mixed memories for me. I remember that on the way to Turkey by air we stayed the night in Athens and, arriving in late afternoon, we grabbed a taxi to get to the Parthenon before sundown. Alas, just as we got to the gate a soldier closed it, and that was the last chance I ever got of seeing over a monument of monuments. But who knows; when "my ship comes in", the very first outlay will be a ticket to Athens!

Incidentally, the stamp illustrated is from a water colour by the late Chief Scout himself.

PEN CANCELLATIONS

Some time ago, I received a letter from a young collector in Merionethshire, part of which read "A few days ago I found a G.B. 'Silver Jubilee' stamp. Could you please tell me how to get ink off a stamp? The stamp in question has been cancelled with ordinary writing ink." Then followed the inevitable query, "Is it valuable?"

It isn't, but the point I want to make is about removing the pen marks. I could tell how to remove ink from stamps, but as it would be quite wrong to carry out such an operation I had better not do anything of the kind (I am sure my correspondent had no intention of using the stamp again, but merely wanted to improve its appearance). As a matter of fact, in the old days stamps were very often only cancelled by a pen, and such stamps can be valuable. It is not often nowadays, however, that such a form of postal obliteration is used, and when you see modern stamps cancelled with ink lines it generally means that the stamps have been used on receipts; and to use them again is to break the law. It would be asking for trouble to do so. One sometimes sees stamps cancelled with purple ink, but in most cases the authorities are very much against this kind of ink being used, as it is the easiest job in the world to remove it, and then, of course, the stamps could be used again.

THE TIP OF THE MONTH

There are so many nice little sets worth buying just now among the issues of the Commonwealth that it is not a question of finding one that will pay for its keep,



but which of the many to select. One that is of interest consists of two stamps issued by Kenya to commemorate the Red Cross Centenary. This does not belong to the

(*Continued in column 1, next page*)

By E. W. Argyle

The Royal Navy On Stamps



WEST INDIES FLEET, 1853

PROBABLY the most interesting of all the stamps depicting the Royal Navy is the 6d. stamp of Jamaica issued in 1919, for it illustrates the transition from sail to steam warships. It shows the West Indies Squadron at Port Royal, and the ships shown are Alban, *4 guns;* Geyser, *6 guns;* Devastation, *6 guns;* Highflyer, *21 guns;* Imaum, *72 guns;* Daring, *12 guns;* Persian, *12 guns;* Buzzard, *6 guns; and* Cumberland, *flagship, 70 guns.*



H.M.S. BEAGLE

SURMOUNTED by a portrait of Charles Darwin, H.M.S. Beagle *appears on a stamp of Ecuador issued in 1936, one of a series commemorating the visit of Darwin to the Galapagos Islands in September 1835. The* Beagle *was a 4-gun sloop of 235 tons, launched at Woolwich in 1820. Under the command of Captain Fitzroy she sailed from Devonport on December 27, 1831 to complete a survey of Patagonia and the west coast of South America.*

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Stamp Gossip—

(*Continued from previous page*)

omnibus issue of the various colonies, and could well be overlooked in the rush to buy all the others. Watch these outside sets, for with so many issues to buy sets such as the Kenya one may be missed, and with such a short life there is no room for delay if you want to buy at current rates.

Another Red Cross issue I like is the one, also of three stamps, issued by Sierra Leone, for the same circumstances obtain. This also is an issue outside the omnibus issues.

Road and Track—

(*Continued from page 464*)

tions were made to the cars entered for the 1910 Prince Henry Trials and they were so successful that in 1911 a model based on this car, but with larger, 4-litre engine, went into production as the Prince Henry model.

Then in 1913 the first 30/98 prototype emerged, built to a customer's special requirements for hill-climbs. The car made the fastest time on its first appearance, but it was not until after the war that it went into production and became catalogued as the world's first sports car. In 1919, with 4½-litre side valve engine, the 30/98 E type, with four-seater Velox body, would reach 85 m.p.h., but was guaranteed to attain 100 m.p.h. at Brooklands with two-seater body and higher axle ratio.

Before he left the firm for America, in 1922, Pomeroy, then Chief Engineer, commissioned a design for a team of 3-litre, 16 valve, twin overhead camshaft cars for use in Grands Prix, the cars being designed by the famous engineer H. R. Ricardo. They were wonderful machines, but unfortunately built to the wrong engine size for the then current Grand Prix regulations. However, they ran in the T.T. and at Brooklands. A few years later two re-appeared in supercharged form with a top speed of around 150 m.p.h. and tremendous acceleration. They were known as Vauxhall Villiers, and were raced by Raymond Mays and David Brown, who today controls Aston Martin. One of these cars was heard of recently in the West Hartlepool area, and if it still exists I know a Vauxhall designer who would like to meet the owner.

In 1922 the OE 30/98 appeared with pushrod o.h.v. engine and continued until 1927 when the company was taken over by General Motors, who produced a rather Americanised car designated the 20/60. Five years before this, Vauxhall sold a considerable number of their nicely-built 14/40 and 23/60 tourers, then came a six-cylinder sleeve-valve engine with flywheel in the centre. In the early thirties came the Vauxhall Cadets, showing American influence, but they were the first British models to feature synchromesh gears. During the last war Vauxhall built Churchill tanks, powered by enormous 12-cylinder engines. After the war, came the Velox, Cresta and Wyvern, later replaced by the Victor and VX 4/90, the first sporting Vauxhall since the 30/98. Today it is the little Viva that is big news.

Dinky Toys News—

(*Continued from page 469*)

Motors, Limited, and is powered by a 4-cylinder aluminium die-cast engine with a capacity of 875 c.c. The rear-mounted engine is also illustrated at the foot of page 468, and, although small, it develops the amazingly high power output of 42 b.h.p. at 5,000 r.p.m. Overall dimensions are as follows: length 11 ft. 7 in., height 4 ft. 6½ in., width 5 ft. ¼ in., wheelbase 6 ft. 10 in., front track 4 ft. 1 in., rear track 4 ft.

You may know that in the Imp the back of the rear seat, or "squab", folds forward to provide considerably more rear luggage space than when it is raised. Rear luggage capacity with the seat up is 5 cu. ft. and, with it down, 16½ cu. ft. In addition, there is 3¼ cu. ft. of luggage space under the bonnet, so you can see that, for such a small car, the amount of luggage which can be carried is enormous. I should describe the Hillman Imp as a revolutionary little car.

Turning to the Dinky Toys model, this is illustrated in colour on our back cover. Like the Triumph, it has an opening bonnet and boot plus Prestomatic steering, 4-wheel suspension, windows and interior fittings. In this model the detailed aluminium-coloured replica of the prototype's engine is, of course, tucked away in the boot, which, together with the rest of the car, is finished in a striking Polychromatic green. Without doubt, the Imp and the Triumph 2000 will be the pride and joy of your collection.

In conclusion, I should explain why some collectors have been experiencing difficulty in obtaining the Plymouth Fury, announced last month. Its delayed appearance was caused by quite unforeseen circumstances which arose after the *M.M.* had gone to press. The trouble has now been overcome.

LETTERS TO THE EDITOR

Sir—With reference to your article on the giant walking dragline in the June 1963 issue, there is a stripping shovel in operation in West Kentucky, U.S.A., which was built and erected by Bucyrus-Erie for the Peabody Coal Company of St. Louis in 1962. This machine is the largest self-propelled land vehicle in existence, has a dipper capacity of 115 cu. yards and weighs 18,000,000 lb. Total height is 220 ft. basic, with a maximum reach of 460 ft.

Powered by 52 electric motors ranging from a quarter to 3,000 h.p., the stripper, or 3850B as it is designated, is operated by a total of 12,000 h.p. Load acceleration is from 0–25 m.p.h. in eight seconds and reverse in four seconds. The structure revolves on a roller circle of 54 ft. diameter with 80 rollers each 22 inches in diameter. Mobility is provided by four sets of dual crawler tracks, each consisting of two 296-ton alloy steel pads. In conjunction with the crawler system, 2,500-ton jacks are used to maintain level working. The hydraulic system alone contains 4,500 gallons of fluid.

Designed to strip overburden and open up otherwise uneconomical coal reserves, the 3850B has a production capacity of 36,000,000 cu. yards of overburden annually. The dipper is a 36,500 lb., 16 ft. wide, one-piece alloy casting and can take 200 tons at one bite. It is so immense that two American-type trucks can be reversed into it at one time. All movements are controlled by two hand levers and the foot pedals, ensuring simple operation.

Considering its dipper capacity of 115 cu. yards against the dipper capacity of the N.C.K. Rapier W.1800 of 40 cu. yards, it seems a case of spade against a teaspoon. —R. Smith (Widnes).

* * * *

Sir—I have just started on a new hobby —I keep lizards. I have three tame blue-tongue lizards and one leaf-tail gecko. The smallest blue-tongue is about six inches long, another is about ten inches long and the third is one foot two inches long. They grow to about two feet in length. The gecko is five inches long and is fully grown. Could you help me about their habits, please?—Stephen Townsend (Jenolan Caves).

(*Is any reader who keeps lizards able to come to Stephen's assistance? Any information sent on to me will be forwarded to him.—Editor.*)

* * * *

Sir—I like the *Meccano Magazine* very much. In the May issue there is a bit about the new Loch Awe Dam, and I should know about it because I live about 30 miles from it. I have not seen it myself but, from the pictures, it will be very hard work building it.

I am ten years old. I hope to keep collecting the *Meccano Magazine* for ever. I have got Meccano Outfit No. 5 and have made lots of models with it.—Forbes A. Johnston (Argyll).

The World's Oldest Railway—

(*Continued from page 451*)

reopening of the Middleton line on June 20, 1960, and was hauled on this 200-year-old railway by the veteran diesel —a unique combination in railway history.

Freight traffic was restarted three months later, after parts of the sidings to nearby works had been relaid, and a reconditioned brake van obtained from British Railways.

The members of the M.R.P.S. have plans for rebuilding the locomotive *Salamanca*, the first steam locomotive in the world to take over the regular operation of a railway. This historic engine, and one named *Prince Regent*, were built in 1812 by Fenton, Murray and Wood (Leeds) to the design of Matthew Murray. They used the rack rail system devised by John Blenkinsop, which enabled a light engine to haul heavy loads without damaging the far from robust rails, and to climb gradients of 1 in 12. In fact, when the rack rails were replaced with adhesion-type track, at the time of the gauge alteration in 1881, it was necessary to re-route part of the line so that the steepness of the inclines became less.

The early locomotives on this railway lacked tenders, doubtless because the coal in the wagons they hauled was under the same ownership and could be dipped into for stoking the engines. Nor had water replenishments to be carried, because the round trip to Leeds and back was so short.

The *Salamanca* and the *Prince Regent*, together with two other rack engines built in 1813, moved more than 100,000 tons of coal in 1814. On the level they could pull 27 wagons, each containing some three tons of coal, at about 3½ m.p.h.

Murray and Blenkinsop have received far less credit as railway pioneers than several other early locomotive designers, probably because they stuck obstinately to their rack traction ideas after the advantages of using smooth-wheel adhesion had been proved.

In fact, when these two great engineers died, the Middleton Railway entered a period of depression and the collieries it served began to decline. Two of the locomotives blew up (one, at any rate, because the driver clamped down the safety valve in an effort to produce more steam pressure!), and in 1835 horses were again used to pull the wagons on the whole railway.

In the early 1860's, however, coal production increased sufficiently for two new locomotives to be built. Named after the two pioneers, Blenkinsop and Murray, they re-started the period of steam traction which has continued on this historic, small railway system until today.

Its re-opening by amateurs has aroused interest abroad as well as in Britain. It has not only appeared in both B.B.C. and commercial television programmes, but has been featured by the German television services and attracted the attention of the National Trust. These are no mean feats for a railway which runs past pit slag heaps and has not the attraction of beautiful scenery to recommend it.

Membership of the Middleton Railway Preservation Society is open to all enthusiasts over sixteen years of age. Junior (under 18) and student membership is 7s. 6d. a year; full membership is 21s. a year. All members receive the club magazine free.

Train spotters in other areas may come across a link with this unique railway. Wagons coming from the Middleton line to British Railways routes carry special labels referring to the source of their journey, and these also bear a picture of *Salamanca*, a truly historic locomotive.



"Gee, mum, the new toaster's smashing!"

This Island can be Towed—

(*Continued from page 473*)

by bulkheads into a series of watertight compartments containing permanent iron or iron and concrete ballast, is also controlled by means of permanent air lines, enabling them to be floated down to the required position and held on site whatever conditions prevail at sea level. At depths of over 600 feet, ancillary buoyancy tanks are attached to the cables to prevent them bowing and to retain their tautness. The "breakthrough" the British designers have achieved is that the stability of the platform no longer depends on the strength of the subsoil below the sea bed.

The experiments carried out at the experimental tank of the Ship Hydrodynamics Division, National Physical Laboratory, Feltham, demonstrated that the platform can withstand waves up to 50 feet in height at 15-second intervals—equivalent to the maximum storm conditions encountered in the Gulf of Mexico once every 25 years—and a windspeed of up to 120 knots, while remaining completely stable.

Not only can the platform be used, therefore, at greater depths than any existing platforms, but it can also withstand operating conditions that are the worst that can be expected. Work can, in fact, be continued while storms of a severe nature are raging. The savings that result from this latter fact can be of great economic significance whether it be in oil drilling, or in carrying out test borings for a deep water bridge, or the Channel Tunnel, or in salvage operations. The advantages of location and security in civil navigation and defence applications are obvious.

In computing the payload that Triton can carry due regard must be paid to possible weather conditions in the area of the chosen site. Let us take a fairly typical example of a self-contained petroleum drilling platform. Such a rig would have a total submerged displacement of 3,600 tons, and would use a triangular buoyancy chamber of 160 foot side and 18 feet 6 inches diameter. The calculated structural weight is 1,000 tons with, say, a further 200 tons for essential deck fittings such as winches and power supplies. A total of 2,400 tons is therefore available for excess buoyancy to prestress the mooring wires, and for payload.

In most weather conditions about 200 tons excess buoyancy would be adequate, but to meet extreme circumstances much more must be available. Thus when the highest wave statistically possible in the hurricane zone acts simultaneously with a 120 m.p.h. wind, an excess buoyancy of about 1,200 tons would be required. At this location, therefore, the platform would have a minimum payload of 1,200 tons, and a maximum payload of 2,000 tons during all except extreme hurricane conditions.

A Model Bus Station—

(*Continued from page 479*)

where No. 1 Brick Rods appear. In particular, note that the No. 1 Brick Rod, marked near the FW on the plan, fits into the hole provided in the top of the French Window and does not fit into the Base. Note also that the Rod used in the bay window passes through the lugs of the Curved Bricks and Curved Window and *not* through their bodies.

You may remember that in the September *M.M.* I mentioned that some Bricks now have a centre groove so that they can be used with the End Brick arrangement of Rods. Another use for them, however, is illustrated in this model. Where the wall, separating the waiting room from the parking area, joins the rear wall, a Rod has been introduced, making use of the centre groove, to give extra rigidity. If, however, you do not possess any of these Bricks there is no need to worry as the extra Rod is not essential.

Concluding, I would like to point out that, if you do not possess all the parts necessary to build this model, you could perhaps make a smaller version based on the same general design but accommodating fewer buses or even smaller vehicles.

Soccer Skills—(*Continued from page 456*)

is the most sensitive part of the foot) and that the trapping leg is almost straight so as to add extra strength. The eyes are fixed firmly on the ball all the time and the arms are helping to give a perfect balance.

The way to practice these three methods between yourselves is to work in pairs. Throw the ball from one to the other to begin with and take turns at controlling it. As you progress, stand further apart and kick the ball from one to another.

Coaster Commentary—

(*Continued from page 465*)

already decided it is a dry-cargo vessel, then the absence of normal masts and derricks, or the existence of very light masts, might give a clue, for it should be remembered that the cargoes are handled entirely by dock cranes.

The Atlantic Steam Navigation Company have several Dutch coasters on long-term charter, two being the sister ships *Goodwill Merchant* and *Goodwill Trader*. These operate container services across the Irish Sea.

It is interesting to note that the Company pioneered an associated venture, the "drive-on-drive-off", in which they use bigger ships somewhat resembling small passenger liners, for example the *Cerdic Ferry*. By this means, and accompanied by their drivers, laden vehicles are taken through the stern doors into a spacious deck holding 100 vehicles, and on the open deck above about 30 containers can be stowed. Known as the Transport Ferry Service, it started immediately after the last war and evolved from the use of the bow-loading Tank Landing Ships. Some idea of its success can be deduced from the fact that 70 vehicles can be discharged and a further 70 loaded within a space of 3–4 hours, and by this "road over the sea" Moscow is only about seven days' drive from Birmingham! In contrast, the cover of the September *M.M.* showed a view of a car-ferry aircraft making its contribution to the "Channel Air Bridge."

Round the Societies—

(*Continued from page 463*)

RAILWAY AND CANAL HISTORICAL SOCIETY

A visit to a canal with an unusual railway interest took place recently during a tour of the Thames and Medway Canal by the Railway and Canal Historical Society. The canal, which was opened in 1824 between Gravesend and Strood with a 2¼ mile long tunnel at Strood, was notable for having had a railway built by the canal company along the tunnel towpath which was opened to passenger traffic in 1845, with the barge traffic continuing alongside. The whole undertaking was sold eventually to the South-Eastern Railway to become part of that company's North Kent line n 1846, the tunnel being drained for railway use.

The society's tour began at Strood with an inspection of the canal basin, now maintained by the Southern Region of British Railways, and on the site of the original Strood terminus in the goods yard. From Strood the tour was continued by service train to Gravesend, the party first travelling through the Strood tunnel to view the 4-chain gap, originally opened out as a passing place for barges. The abandoned terminus of the shortened canal was seen at Righam and special interest was shown in the nearby canal-side obelisk erected to mark the boundary of jurisdiction between the cities of London and Rochester over navigation on the canal. Further visits were made to the canal and to the original railway terminus site in Gravesend and also to the Gravesend Central Library where a wide selection of maps, prints and other items relating to the canal and railway were displayed by courtesy of the Borough Librarian.

The tour was organised by the London group of the society. Copies of the historical notes issued for the occasion are obtainable from the Hon. Group Secretary, Mr. J. A. Hall, of Flat 3, 110 Crouch Hill, London N.8., price 1/– post free.

Calling All Bus Spotters—

(*Continued from page 472*)

feels certain that as yet the express coach has not received any serious setback at the hands of the private motorist. I noticed that on a map near his desk he had marked in all the railway lines condemned for execution under the Beeching Plan, which may bring even more passengers in the future to Cheltenham.

The "Coaching Station", as it is described on the town map, on the fashionable Promenade (no, Cheltenham is *not* on the sea coast nor even on a river) was opened before the last war on a three-and-a-half acre site on which formerly stood St. Margaret's Hall and other buildings. However, on December 11, 1940 German bombs almost destroyed the station and it was not completely reconstructed until January 1956. Certainly, not to have witnessed a mass exodus at Cheltenham is not to have really lived, in a coach spotter's sense!

Cheltenham is a very colourful place from both a livery and a fleet legend standpoint, for it is served by *Red* and *White*, *Yellow*ays, Royal *Blue*, Midland *Red*, Stratford *Blue*, Bristol *Grey*hound and last, but not least, *Black* and *White*. Cheltenham Coach Station is the home of this last-named firm, who now operate a fleet of 113 vehicles. They began in April 1928, and now run not only express services, but also extended coaching tours of North Wales commencing in London, and day and half-day excursions starting from Cheltenham.

In 1962, their fleet covered more than 3,000,000 miles—a new record for Black and White. From a staff of 170 drivers (there are no conductors) at the summer peak, the staff dwindles to 54 during the lean months of January and February; likewise at that time only 35 to 40 coaches are licensed. Black and White believe in giving passengers plenty of leg room, so they restrict 30-footers normally to 33 or 37 seats, and 36-footers to only 47. At present they have on order a further five coaches of both lengths.

I asked why the former practice of having fleet and registration numbers coinciding had ceased. Mr. Purvess told me that this was due to Gloucestershire licensing authority being unwilling to book numbers not likely to be issued within the particular month in which the coach was to be registered for the first time. The best they can do at the present is to get the unit digits to agree.

* * * *

An attractive new Annual designed specially for bus enthusiasts is reviewed on page 476.



"I've been suffering from mental cruelty—the sums were too hard."

Air News— (*Continued from page 467*)

eventually to devise a type of fuel tank that will survive a heavy crash without breaking open to cause a fire, seat mountings that will not break loose under a heavy impact, and other cabin equipment that will provide passengers with an even higher standard of safety than that offered by modern airliners.

Miniature Train Formations—

(*Continued on page 482*)

line which is quite authentic, and it follows that the operation of even this simple miniature formation has a very varied sequence. For example, if the machinery of your sawmill is steam operated and driven, you will need to accept regular and periodic coal wagons into the empty wagon siding, at the end of which you can introduce a coal stockyard.

LOTT'S

CHEMISTRY SETS

REGD. TRADE MARK



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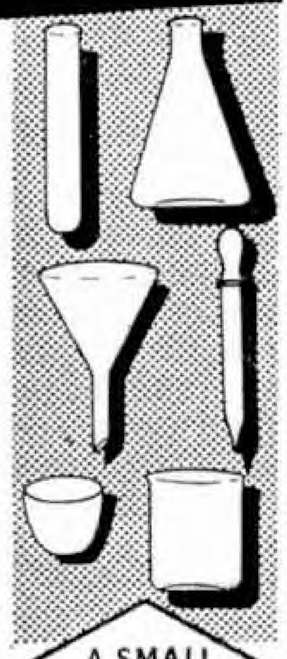
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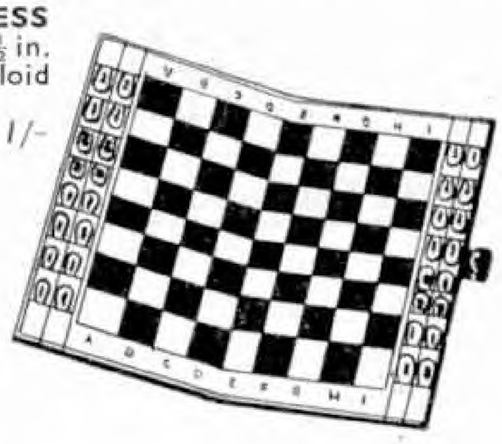
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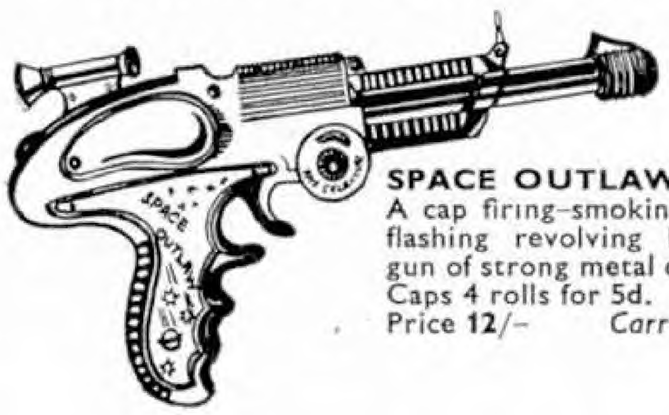
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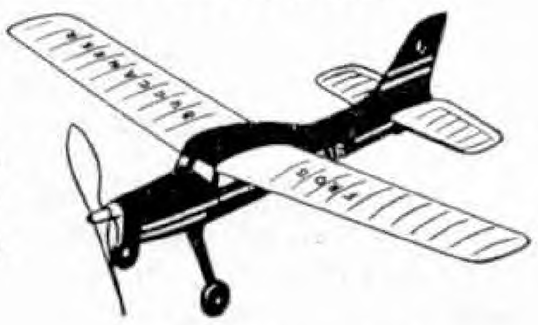
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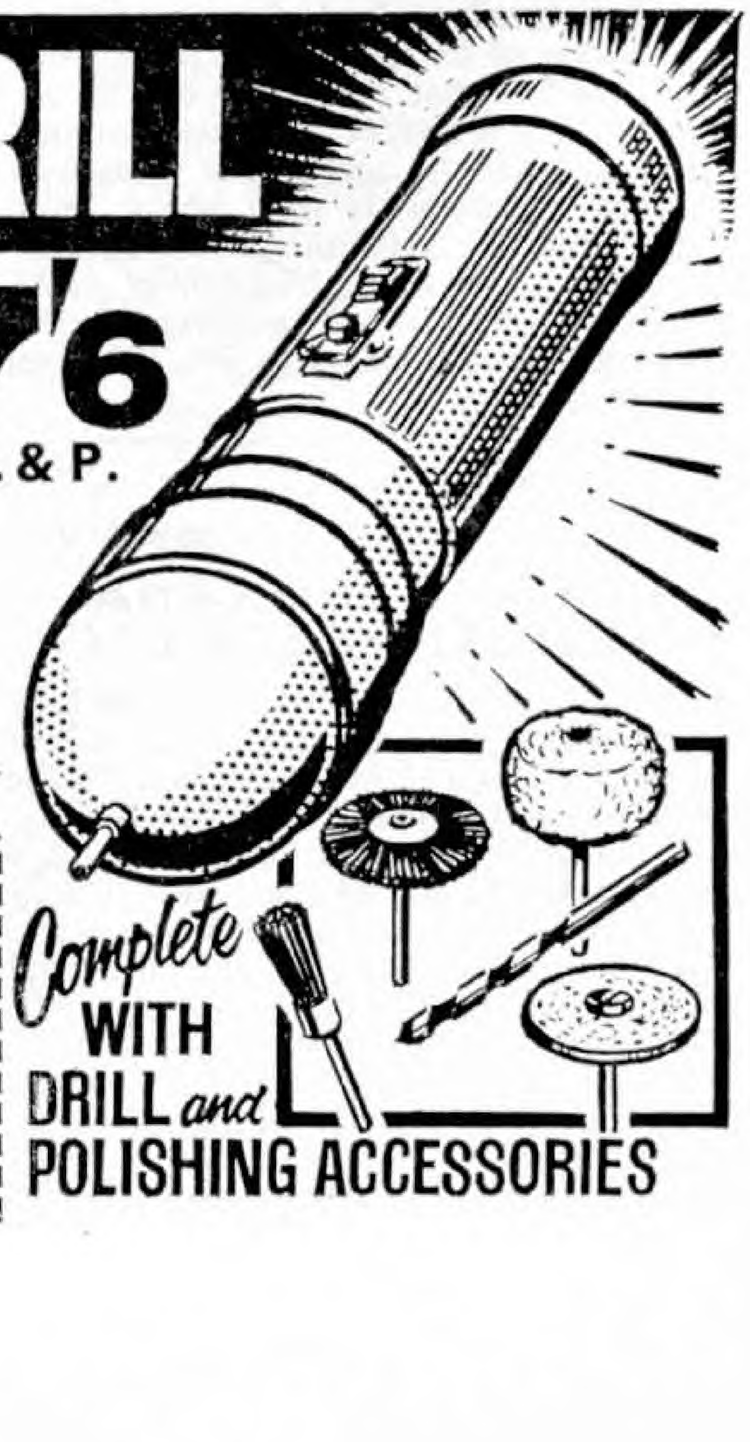
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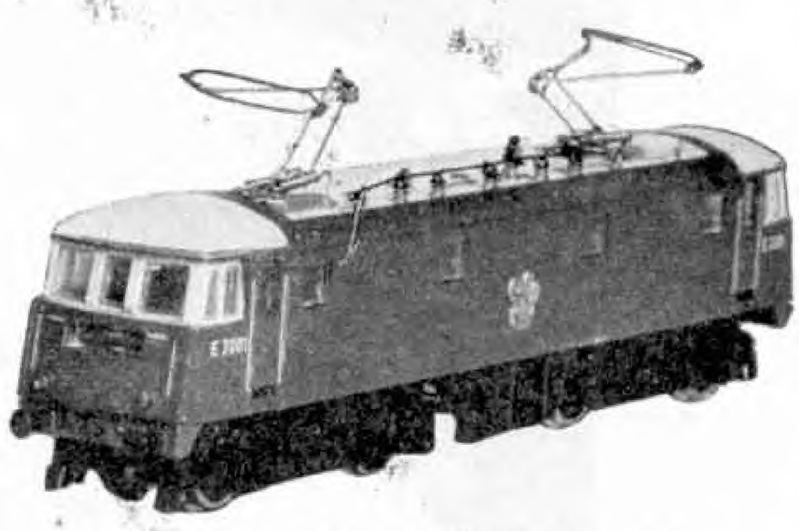
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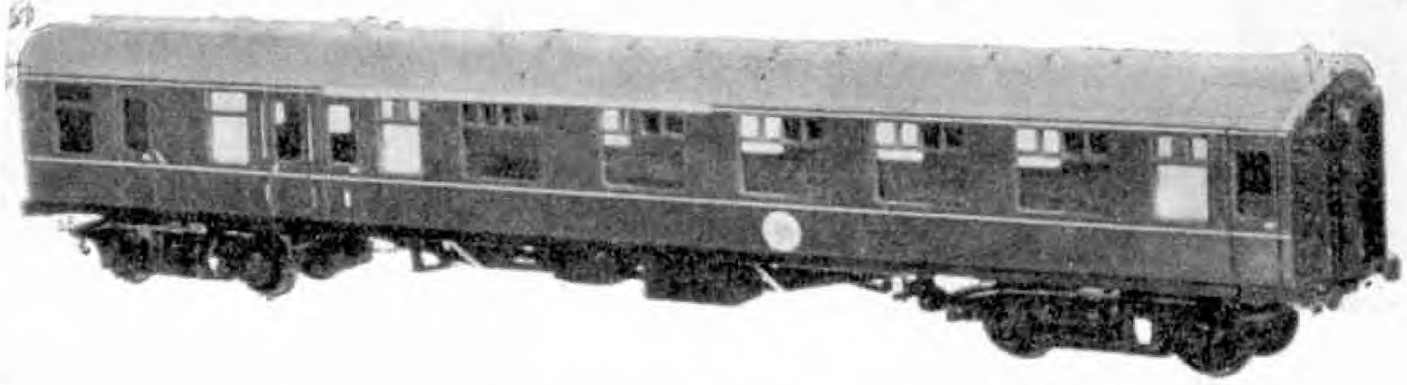
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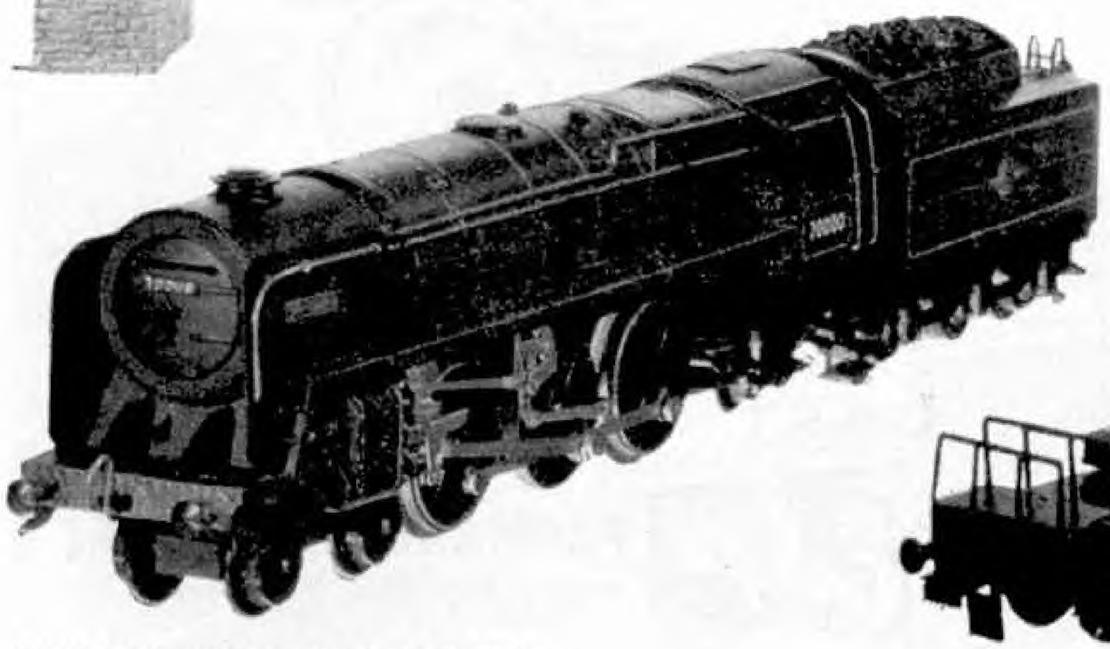
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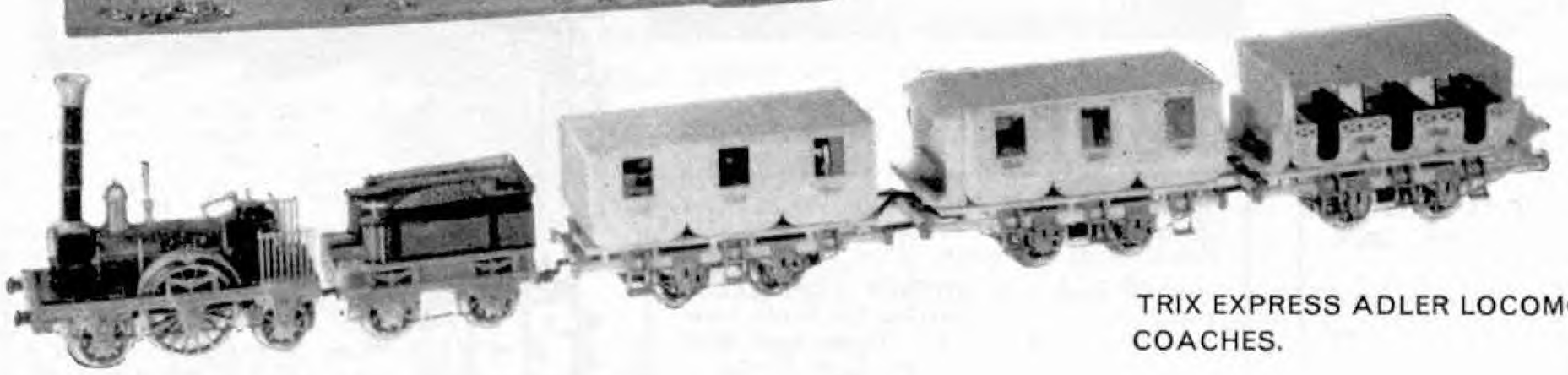
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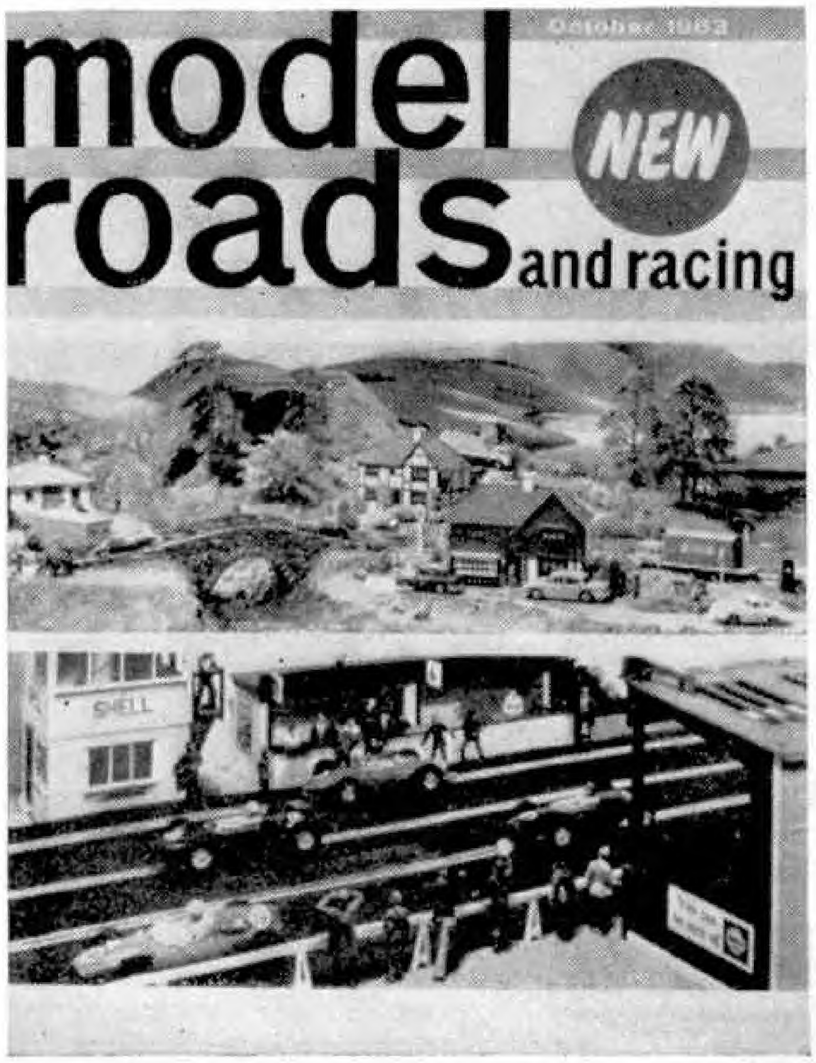
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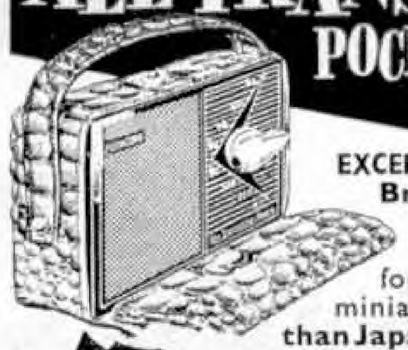
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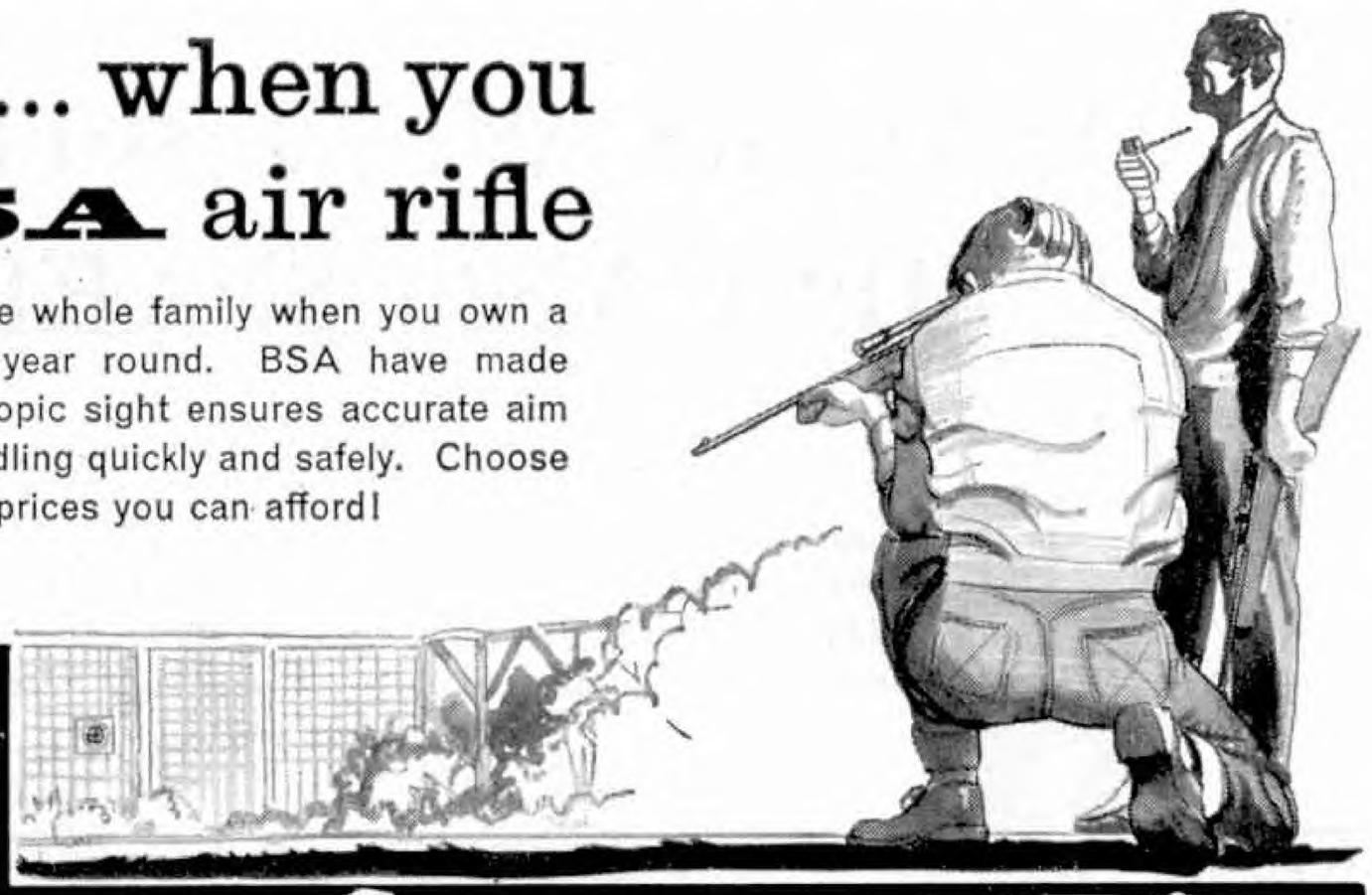


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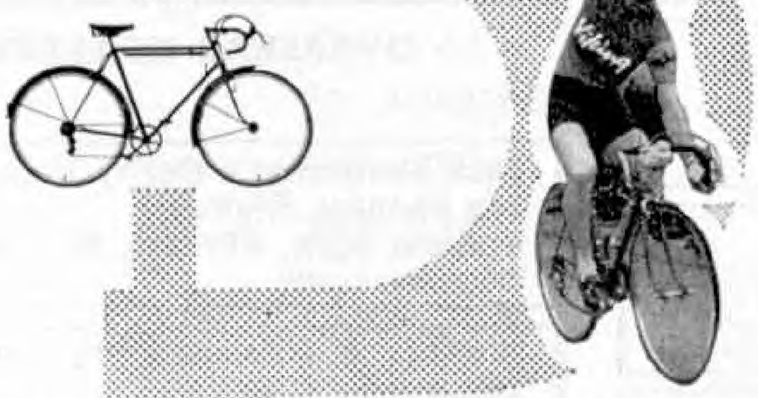
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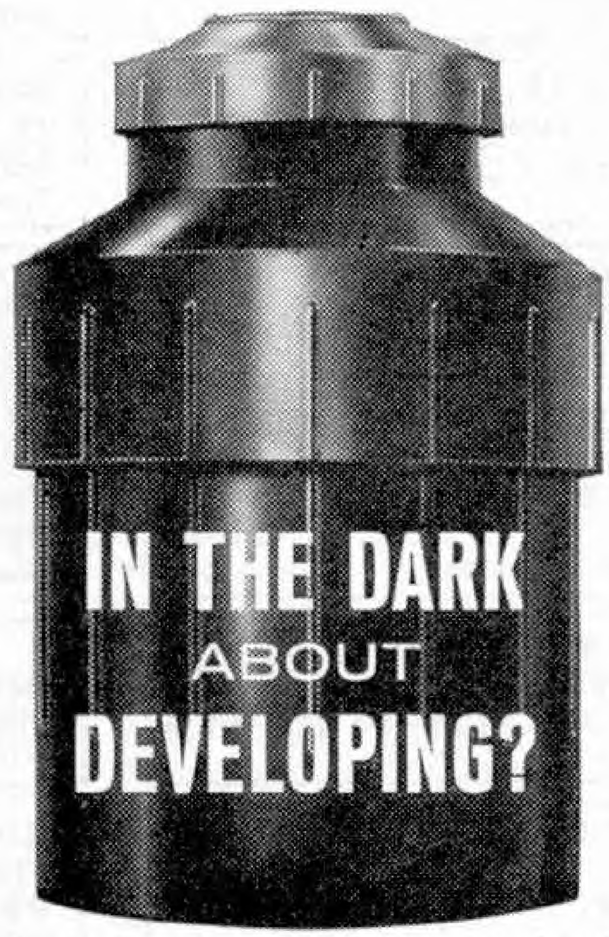
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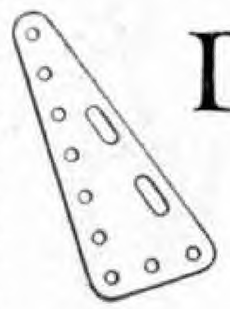
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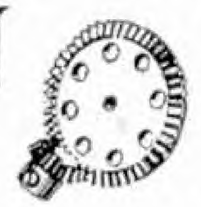


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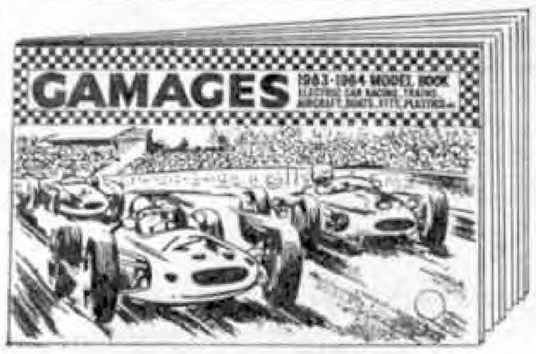
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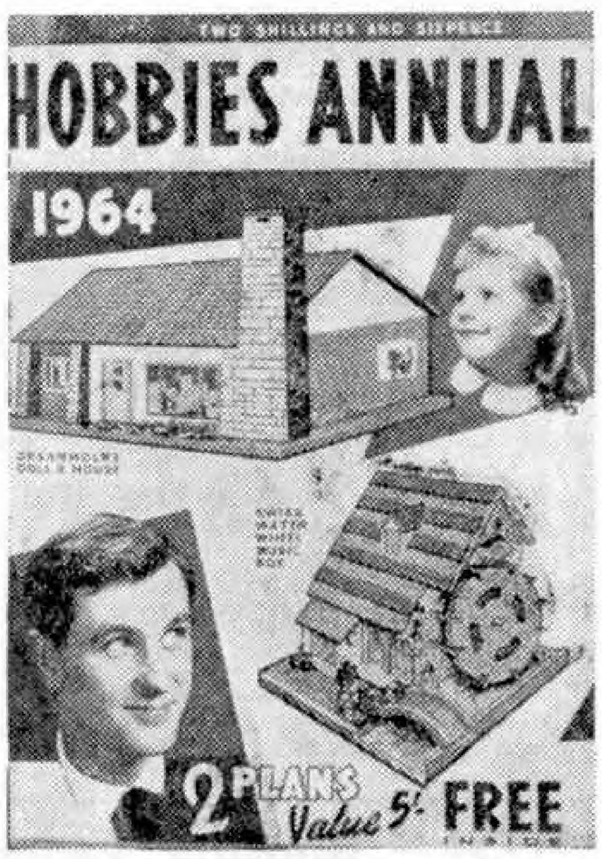
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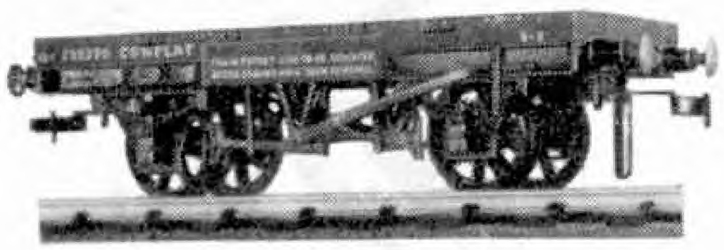
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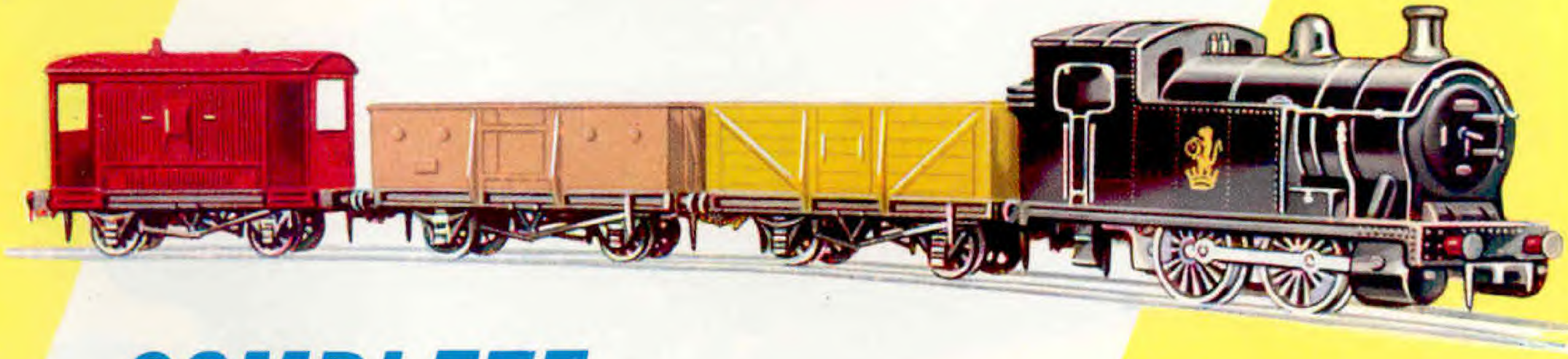
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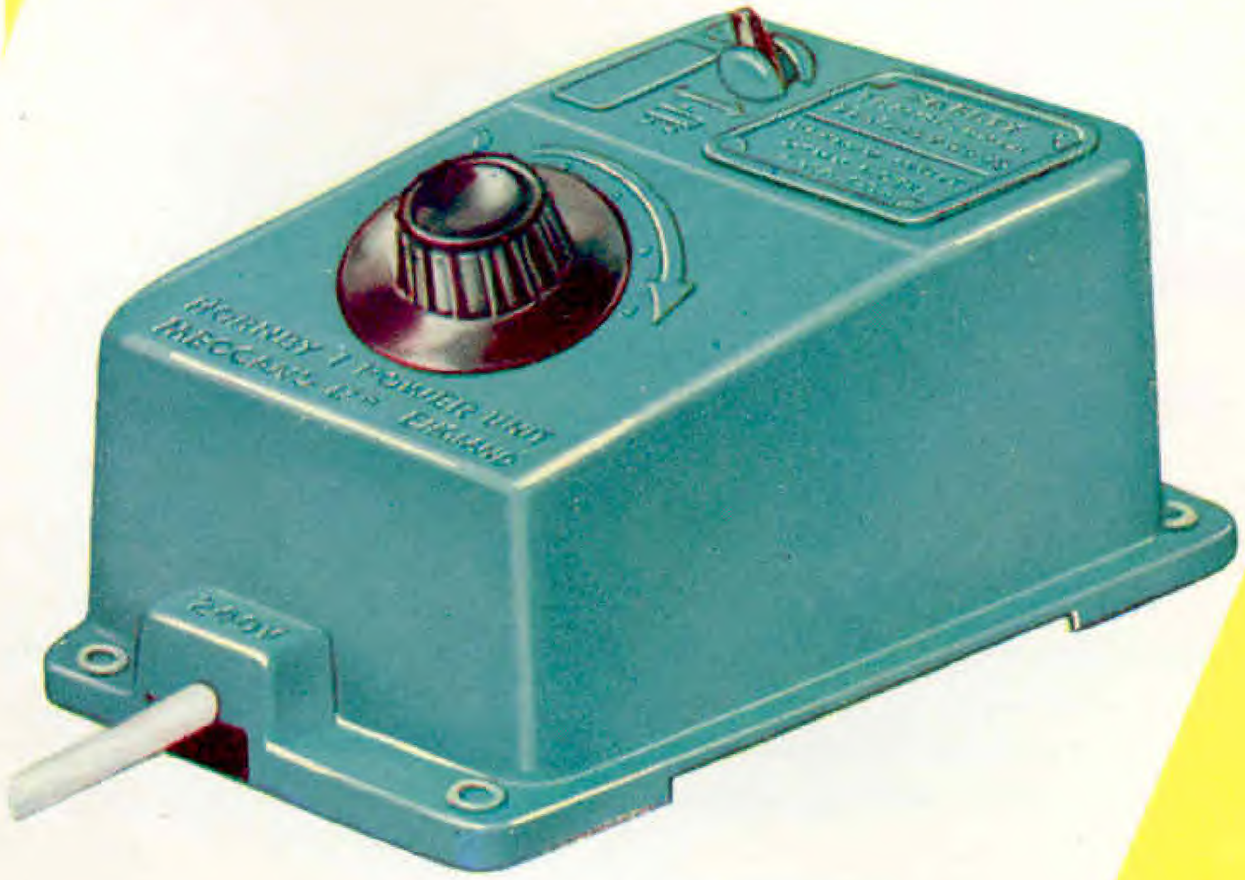
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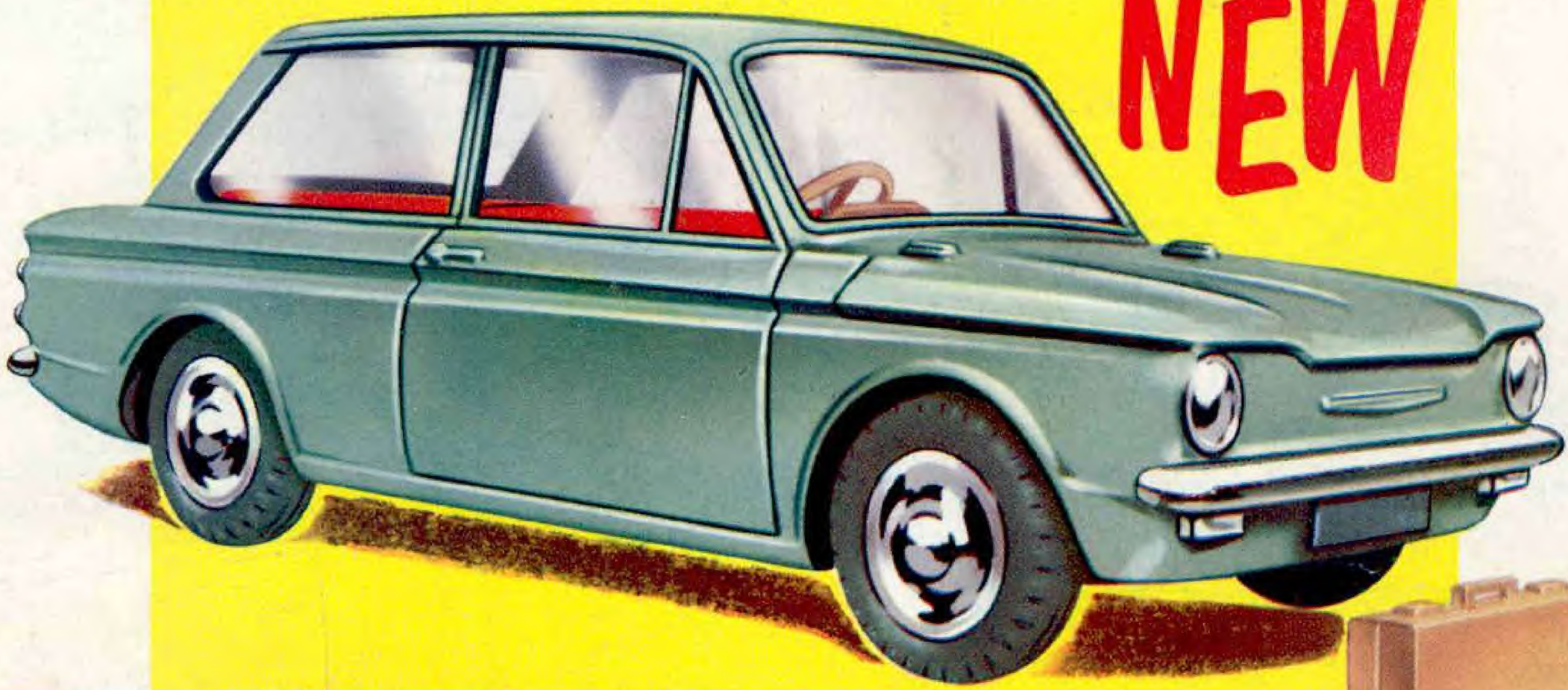
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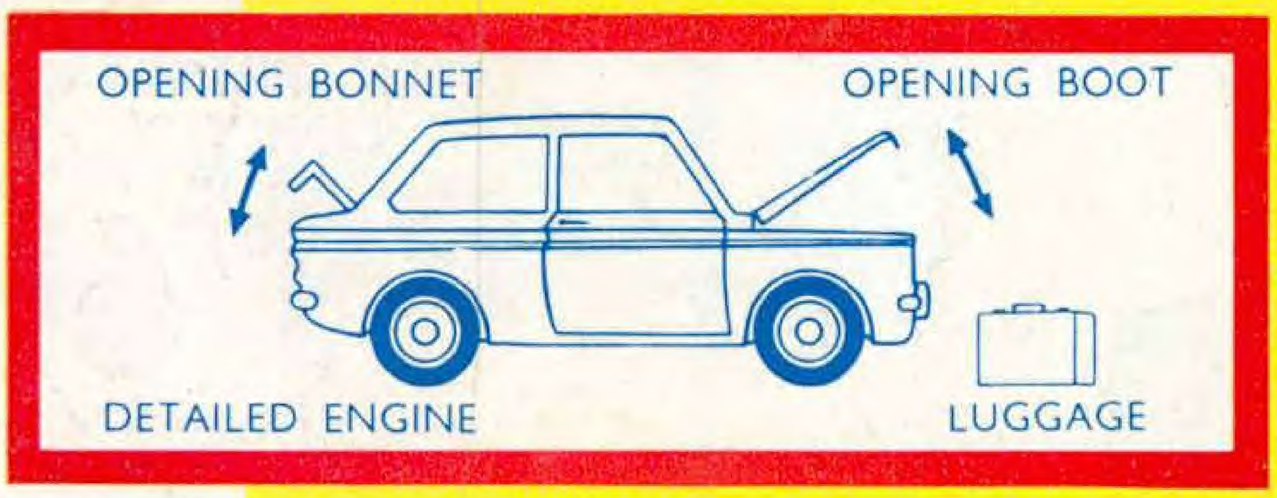
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